Service Manual

SR3369E/SR4069E

Rough terrain Mobile Elevating Work Platform

⚠WARNING
Operators and maintenance personnel must read and understand this manual before operating and maintaining this machine, otherwise it may lead to casualties! This manual shall be properly kept for reference and check by relevant personnel.

LINGONG HEAVY MACHINERY CO., LTD.

Rough terrain Mobile Elevating Work Platform

Service Manual

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Contents

Foreword

You are welcome to purchase and use the products produced by Lingong Heavy Machinery Co., Ltd. This manual introduces the technical parameter and maintenance adjustment data of Rough terrain mobile elevating work platform, and explains the troubleshooting and maintenance process for qualified professional maintenance personnel. The information contained in this manual are correct at the time of publication, but due to the continuous improvement of the structure and performance of our products, the design as well as operation and maintenance instructions of the product may be subject to change without notice. For the latest information about the machine and questions about this manual, please contact our company. At the same time, we encourage readers to feedback errors to Lingong Group Jinan Heavy Machinery Co., Ltd. and put forward suggestions for improvement. All suggestions will be carefully considered in the future publication and printing of this manual.

⚠ WARNING

- Only specially trained and qualified personnel can operate, repair and maintain the machine.
- Incorrect operation, maintenance and repair are dangerous and can lead to personal injury or death.
- Before operating or maintaining the machine, the operator should read this manual carefully. Do not operate, maintain or repair this platform without reading and understanding this manual.
- Please load the machine in strict accordance with the rating, otherwise all the consequences arising from overloading or unauthorized modification will be borne by the user.
- The operating procedures and precautions provided in this manual are only applicable to the specified purposes of this machine. If it is used for operations other than those specified but not prohibited, make sure that this operation does not cause harm to you or others.

Safety Notices

The operator should understand and follow the current national and local safety regulations. If there are no national or local regulations, the safety instructions in this manual shall be applicable.

Most accidents are caused by failure to comply with the regulations on the operation and maintenance of the machine. In order to avoid accidents, please read, understand and observe all warning requirements and precautions in this manual and on the machine before operation and maintenance. Failure to comply with the instructions and safety rules in this manual and the corresponding manual on the machine will result in death or serious injury.

Since it is impossible to foresee all possible dangers, the safety instructions in this manual and on the machine cannot include all safety precautions. If steps and operations not recommended in this manual are used, you must ensure that you and other people are safe and the machine will not be damaged. If you are not sure about the safety of some operations, please contact our company or dealer.

Some operations to the machine require not only basic mechanical, hydraulic and electrical skills, but also professional skills, tools, lifting equipment and suitable workshop. In these cases, we strongly recommend that the maintenance and repair should be carried out at a service center authorized by Lingong Heavy Machinery Co., Ltd.

The maintenance precautions given in this manual are only applicable when the machine is used for the specified purpose. If the machine is used in the scope out of this manual, our company will not assume any safety responsibility, and the safety responsibility in such operations shall be borne by the user and the operator. Under no circumstances shall the operations prohibited in this manual be performed.

Most of the maintenance process can only be performed by trained professional service personnel in properly equipped workshops.

⚠DANGER - Indicating any existing dangers that, if not avoided, will cause serious injury or even death, and also serious machine damage.

⚠WARNING - Indicating any potential dangers that, if not avoided, may cause death or serious injury, and also serious machine damage.

⚠CAUTION - Indicating situations that, if not avoided, may cause minor or moderate injury, and also machine damage or shortened machine service life.

Chapter Ⅰ Safety and EnviroN•ment

1.1 Terms and Definitions

Administrator: the entity or individual that directly controls the use and application of the lifting platform, which usually refers to the owner, the renter or the authorized personnel of owner who obtains the control right of the lifting platform;

Operator: personnel who has been professionally trained and mastered qualified knowledge and practical experience to operate the lifting platform.

Qualified personnel: those with recognized academic qualifications, certificates, professional status, or relevant professional knowledge, trained and experienced, who can effectively prove their ability to solve the difficulties encountered in related matters, work or projects.

Safety notice: relevant safety information issued by Lingong Heavy Machinery Co., Ltd.

1.2 Compliance

1. The maintenance is required to be carried out by personnel who have received and qualified in the maintenance training of this machine.
2. Immediately mark the machine if it is damaged or faulty, and withdraw it out of service.
3. Repair any damage or fault before operating the machine.

1.3 Before maintenance

1. Read and follow the safety rules and maintenance instructions in the corresponding operation manuals on the machine.
2. Ensure that all necessary tools and parts are in place.
3. Do not use parts not sold by Lingong Heavy Machinery Co., Ltd.
4. Please read each step thoroughly and follow the instructions, and do not try to perform repair by shortcut, as this is dangerous.

1.4 Workplace requirements

The machine shall be able to operate safely under the following conditions:

1. Altitude ≤ 1000m/3281ft;
2. Ambient humidity ≤ 90% (at +25℃).
3. The machine shall be able to operate normally under the following safe conditions:

—Ambient temperature of -20℃ ~ +40℃;

—Wind speed: ≤ 12.5m/s/28mph.

4. During normal operation or maintenance, please set up protective devices as the movement of mechanism and parts may cause danger to human body.
5. Take measures to prevent the danger caused by parts falling from the platform.

1.5 Safety precautions for maintenance and repair

1. Before adjusting and repairing the machine, the following preventive measures shall be taken
   - Park the machine on a solid and level ground
   - Block the wheels
   - Cut off the power supply to disable the machine;
   - Set all controls in “OFF” position to prevent the operating system from being started by

accident;

- If possible, lower the platform to the lowest position, otherwise, ensure that it will not fall;
- Before loosening or removing hydraulic components, release the hydraulic oil pressure in the hydraulic pipeline;
- Place safety supports as required.

2. Maintenance personnel training

   Maintenance personnel must be trained by qualified personnel to inspect and maintain the machine in accordance with the requirements of this manual.

3. Parts replacement

   The replacement components and parts must be the original parts of our company, otherwise the product will not be maintained or repaired.

4. Service announcement

   Users shall maintain and repair the machine in strict accordance with the service announcement issued by Lingong Heavy Machinery Co., Ltd.

1.6 Intended use

This machine is only intended for lifting people and their tools and materials to a high-altitude workplace.

1.7 Description

Most maintenance processes can only be performed by professionally trained maintenance personnel in a properly equipped workshop. After troubleshooting, select the appropriate maintenance steps.

Perform the disassembly steps until the repair can be completed. Then perform the disassembly steps in the reverse order.

It is strongly recommended to carry out maintenance and repair at the service center authorized by Lingong Group Jinan Heavy Machinery Co., Ltd.

Symbol representation

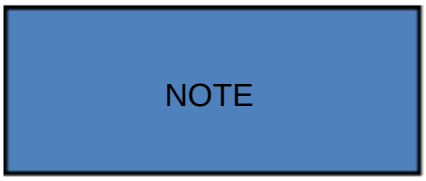
Symbols, color codes and symbolic words used by LGMG products have the following meanings:

Safety warning sign - used for warning of potential personal injury. Observe all safety tips after this sign to avoid possible personal injury or death.

Red - Indicating a hazardous situation. If it is not avoided, it will lead to death or serious injury of personnel.

Orange - Indicating a hazardous situation. If it is not avoided, it may cause death or serious injury.

Yellow - Indicating a dangerous situation. If not avoided, it may cause minor or moderate personal injury.



Blue - Indicating a dangerous situation. If not avoided, it may result in property damage.

Chapter Ⅱ Product Introduction

2.1 Machine parameters

2.1.1 SR3369E（S33690DTAE30）Machine parameters

1. Parameters of machine

Item	Parameter	Item		Parameter
Rated load (kg/lbs)	454/1000	Fork lifting time (s)		39±4
Extension platform rated load (kg/lbs)	140/310	Fork lowering time (s)		46±4
Total weight (kg/lbs)	4350/9570	Maximum manual force	Indoor (N)	400
Maximum number of operators (indoor)	4		Outdoor (N)	400
Maximum number of operators (outdoor)	2	Theoretical maximum gradeability (no-load, stowed)		35%
Max. working height (m/ft)	11.7/38.4	Maximum allowable tilt angle	X-direction: left/right	2°
Max. platform height (m/ft)	9.7/31.8		Y-direction: front/rear	3°
Min. turning radius (m/ft)	4.75/15.58	Maximum turning angle of inner wheel		45°
Max. travel speed (stowed) (km/h/mph)	6.1/3.78	Max. allowed wind speed (m/s/mph)		12.5/28
Max. travel speed (extended) (km/h/mph)	0.5/0.28	Drive mode		Rear-wheel drive
Max. braking distance (no-load, stowed) (m/ft)	1.5/4.9			Front wheel steering

2. Main dimensions

Item	Parameter	Item	Parameter
Overall length (m/ft)	3.76/12.33	Platform extension dimension (m/ft)	1.52/4.99
Overall width (m/ft)	1.79/5.87	Track width (mm/in)	2290/75.1
Overall height (guardrail unfolded) (m/ft)	2.55/8.37	Wheelbase (front/rear) (mm/in)	1507/49.4
Overall height (guardrail folded) (m/ft)	1.89/6.2	Min. ground clearance (mm/in)	230/9.06
Dimension of main platform (m/ft)	2.79×1.6/9.15×5.25	Tire specification (diameter×width) mm/in	Φ663×283/Φ26×12

3. Transmission system

Item		Parameter
Walking reducer	Rated output torque (N•m)	3500
	Speed ratio	57.49：1

4. Hydraulic system

Item			Parameter
Functional system	Type		Open
	Pump displacement (ml/r)		4.5
	Lifting system	Max. working pressure (MPa/psi)	19.7/2857
	Steering system	Max. working pressure (MPa/psi)	10.3/1494

5. Electrical system

Item		Parameter
Motor	Rated voltage (V)	29
	Rated current (A)	125
	Rated power（KW）	3.56
	Rated speed（r/min）	3400
Lifting motor	Rated voltage (V)	48
	Rated current (A)	330
	Rated power（KW）	8.9
	Rated speed（r/min）	3290
Battery	Output voltage (V)	6
	Capacity (Ah)	315(20-hour discharge rate)
Charger	Nominal AC input voltage (V)	85-265 AC
	Maximum AC input current (A)	15
	Nominal DC output voltage (V)	48
	Maximum DC output current (A)	35
Control system	Voltage (V)	24

6. Fluid filling amount

Item	Parameter	Item	Parameter
Hydraulic oil (L)	70	Travel reducer gear oil (L)	0.68×2

2.1.2 SR4069E（S40690DTAE30）Machine parameters

1. Parameters of machine

Item	Parameter	Item		Parameter
Rated load (kg/lbs)	365/805	Fork lifting time (s)		61±4
Extension platform rated load (kg/lbs)	140/310	Fork lowering time (s)		55±4
Total weight (kg/lbs)	5100/11245	Maximum manual force	Indoor (N)	400
Maximum number of operators (indoor)	3		Outdoor (N)	400
Maximum number of operators (outdoor)	2	Theoretical maximum gradeability (no-load, stowed)		35%
Max. working height (m/ft)	13.9/45.6	Maximum allowable tilt angle	X-direction: left/right	2°
Max. platform height (m/ft)	11.9/39		Y-direction: front/rear	3°
Min. turning radius (m/ft)	4.75/15.58	Maximum turning angle of inner wheel		45°
Max. travel speed (stowed) (km/h/mph)	6.1/3.78	Max. allowed wind speed (m/s/mph)		12.5/28
Max. travel speed (extended) (km/h/mph)	0.5/0.28	Drive mode		Rear-wheel drive
Max. braking distance (no-load, stowed) (m/ft)	1.5/4.9			Front wheel steering

2. Main dimensions

Item	Parameter	Item	Parameter
Overall length (m/ft)	3.76/12.38	Platform extension dimension (m/ft)	1.52/4.99
Overall width (m/ft)	1.79/5.87	Track width (mm/in)	2290/75.1
Overall height (guardrail unfolded) (m/ft)	2.7/8.86	Wheelbase (front/rear) (mm/in)	1507/49.4
Overall height (guardrail folded) (m/ft)	2.04/6.69	Min. ground clearance (mm/in)	230/9.06
Dimension of main platform (m/ft)	2.79×1.60/9.15×5.25	Tire specification (diameter×width) mm/in	Φ663×283/Φ26×12

3. Transmission system

Item		Parameter
Walking reducer	Rated output torque (N•m)	3500
	Speed ratio	57.49：1

4. Hydraulic system

Item			Parameter
Functional system	Type		Open
	Pump displacement (ml/r)		4.5
	Lifting system	Max. working pressure (MPa/psi)	19.7/2857
	Steering system	Max. working pressure (MPa/psi)	10.3/1494

5. Electrical system

Item		Parameter
Motor	Rated voltage (V)	29
	Rated current (A)	125
	Rated power（KW）	3.56
	Rated speed（r/min）	3400
Lifting motor	Rated voltage (V)	48
	Rated current (A)	330
	Rated power（KW）	8.9
	Rated speed（r/min）	3290
Battery	Output voltage (V)	6
	Capacity (Ah)	315(20-hour discharge rate)
Charger	Nominal AC input voltage (V)	85-265 AC
	Maximum AC input current (A)	15
	Nominal DC output voltage (V)	48
	Maximum DC output current (A)	35
Control system	Voltage (V)	24

6. Fluid filling amount

Item	Parameter	Item	Parameter
Hydraulic oil (L)	70	Travel reducer gear oil (L)	0.68×2

2.2 Specification for selection of tightening torque of the lifting platform

The tightening torque tolerance range is 10% for all hydraulic seals, important transmission connectors and key processes with defined torque tightening requirements, and 20% for non-essential reference torques, which is to be rounded to the nearest integer when necessary.

Table 1: Tightening torque of metric/imperial-threaded fittings and plugs (unit: N•m)

Tightening torque of metric-threaded oil ports					Tightening torque of imperial-threaded oil ports				
Pipe diameter	Thread specification (mm)	Fitting type		Plug	Pipe diameter	Thread specification (Inch)	Fitting type		Plug
		Type E	Type F	VSTI-E			Type E	Type F	VSTI-ED
6L	M10X1.0	27	22	16	6L	G1/8A	22	16	16
8L	M12X1.5	37	32	27	8L	G1/4A	37	32	32
10L	M14X1.5	58	48	37	10L	G1/4A	37	32	/
12L	M16X1.5	75	58	58	12L	G3/8A	75	58	63
15L	M18X1.5	95	75	70	15L	G1/2A	120	95	85
18L	M22X1.5	140	115	95	18L	G1/2A	120	95	/
22L	M28X2.0	190	160	140	22L	G3/4A	190	160	140
28L	M33X2.0	325	220	235	28L	G1A	325	220	210
35L	M42X2.0	470	295	380	35L	G11/4A	470	315	470
42L	M48X2.0	565	380	/	42L	G11/4A	565	380	470
6S	M12X1.5	42	37	/	6S	G1/4A	42	37	/
8S	M14X1.5	53	48	/	8S	G1/4A	42	37	/
10S	M16X1.5	75	58	/	10S	G3/8A	85	63	/
12S	M18X1.5	95	75	/	12S	G3/8A	85	63	/
14S	M20X1.5	130	85	/	14S	G1/2A	120	95	/
16S	M22X1.5	140	105	/	16S	G1/2A	120	95	/
20S	M27X2.0	190	180	/	20S	G3/4A	190	160	/
25S	M33X2.0	325	325	/	25S	G1A	325	220	/
30S	M42X2.0	470	345	/	30S	G11/4A	470	315	/
38S	M48X2.0	565	440	/	38S	G11/2A	565	380	/

Table 2: tightening torque of UN-threaded fittings and plugs (unit: N•m)

Product Series	Thread UN/UNF	Non-directional assembly torque N•m	Non-directional assembly torque N•m
EO-L	7/16-20 UN(F)	23	18
	1/2-20 UN(F)	28	28
	9/16-18 UN(F)	34	34
	3/4-16 UN(F)	60	55
	7/8-14 UN(F)	115	80
	1-1/16-12 UN(F)	140	100
	1-5/16-12 UN(F)	210	150
	1-5/8-12 UN(F)	290	290
	1-7/8-12 UN(F)	325	325
EO-S	7/16-20 UN(F)	20	20
	1/2-20 UN(F)	40	40
	9/16-18 UN(F)	46	46
	3/4-16 UN(F)	80	80
	7/8-14 UN(F)	135	135
	1-1/16-12 UN(F)	185	185
	1-5/16-12 UN(F)	270	270
	1-5/16-12 UN(F)	270	270
	1-5/8-12 UN(F)	340	340
	1-7/8-12 UN(F)	415	415

Description:

1. Table 1 gives the torques for metric-threaded joints and inch-threaded joints, and Table 2 gives the torques for UN-threaded joints, and for those torques, an error of +10% is allowed;

2. The torque values given in Table 1 and Table 2 are based on the condition that the connected part is made of steel, and for connected part made of aluminum, the tightening torque equal to 60% of the corresponding torque in Table 2 and Table 3 shall apply and shall be rounded to the nearest integer after calculation;

3. For Parker joints, the torque is to be selected according to the name and specification, and for ordinary joints, the torque is to be selected according to the thread specification.

For example:

1) GE 28 L M ED OMD A3C: GE for straight-through joint, 28 for pipe diameter, L for normal pressure, M for metric thread, ED for E-type elastic seal, OMD for no nut sleeve, A3C for galvanizing; According to the 28L M ED, the torque value can be selected from Table 1: 325N•m

2) GE O 22L R 3/4 OMDA3C: O represents the F-type 0-ring seal, R represents the inch thread, and 3/4 represents the thread specification G3/4; According to O 22L R3/4, the torque value can be selected from Table 2: 160N•m;

3) GE O 20 S R OMDCF: S represents the heavy pressure, and the torque value selected according to O 20 S R is: 160 N•m;

Table 3: Tightening Torque of Metric-Threaded Swivel Nuts (unit: N•m)

Pipe diameter	Thread specifications	Tightening torque	Pipe diameter	Thread specifications	Tightening torque N•m
06L	M12X1.5	16	06S	M14X1.5	27
08L	M14X1.5	22	08S	M16X1.5	42
10L	M16X1.5	32	10S	M18X1.5	53
12L	M18X1.5	42	12S	M20X1.5	63
15L	M22X1.5	58	14S	M22X1.5	80
18L	M26X1.5	90	16S	M24X1.5	85
22L	M30X2	115	20S	M30X2	125
28L	M36X2	135	25S	M36X2	180
35L	M45X2	220	30S	M45X2	260
42L	M52X2	345	38S	M52X2	370

Description:

1) For torques given in Table 3, an error of +10% is allowed;

2) The torque values given in Table 3 are based on the condition that the connected part is made of steel, and for connected part made of aluminum, the tightening torque equal to 60% of the corresponding torque in Table 1 shall apply and shall be rounded to the nearest integer after calculation;

3) For Parker rubber hoses, right-angle joints and tee joints, the torque is to be selected according to the name and specification, and for ordinary rubber hoses, right-angle joints and tee joints, the torque is to be selected according to the thread specification.

For example:

1) F481 CACF 2815 16: F481 for crimping form and hose type, CACF for joint type at both ends, CA for 24° conical swivel nut with O-ring, CF for 90° elbow of 24° conical swivel nut with O-ring,

and 2815 for connection specification of joint at both ends of hose. According to this, the torque selected for end 28 is 135N•m, and the torque selected for end 15 is 58N•m;

2) F412 SN CACF 1210 06: SN represents heavy pressure hose, the torque at end 12 is 63 N•m, and the torque at end 10 is 53 N•m;

3) EW15LOMDA3C: EW represents a right-angle combination fitting. The torque value selected from Table 1 according to 15L is 32 N•m.

Table 4: Tightening torque of ordinary bolts (unit: N•m)

Strength grade of bolt	Yield strength N/MM²	Nominal diameter of bolt mm				
		6	8	10	12	14
		Tightening torque N·m				
4.6	240	4～5	10～12	20～25	36～45	55～70
5.6	300	5～7	12～15	25～32	45～55	70～90
6.8	480	7～9	17～23	33～45	58～78	93～124
8.8	640	9～12	22～30	45～59	78～104	124～165
10.9	900	13～16	30～36	65～78	110～130	180～210
12.9	1080	16～21	38～51	75～100	131～175	209～278
Strength grade of bolt	Yield strength N/MM²	Nominal diameter of bolt mm				
		16	18	20	22	24
		Tightening torque N·m				
4.6	240	90～110	120～150	170～210	230～290	300～377
5.6	300	110～140	150～190	210～270	290～350	370～450
6.8	480	145～193	199～264	282～376	384～512	488～650
8.8	640	193～257	264～354	376～502	521～683	651～868
10.9	900	280～330	380～450	540～650	740～880	940～1120
12.9	1080	326～434	448～597	635～847	864～1152	1098～1464
Strength grade of bolt	Yield strength N/MM²	Nominal diameter of bolt mm				
		27	30	33	36	39
		Tightening torque N·m				
4.6	240	450～530	540～680	670～880	900～1100	928～1237
5.6	300	550～700	680～850	825～1100	1120～1400	1160～1546
6.8	480	714～952	969～1293	1319～1759	1694～2259	1559～2079
8.8	640	952～1269	1293～1723	1759～2345	2259～3012	2923～3898
10.9	900	1400～1650	1700～2000	2473～3298	2800～3350	4111～5481
12.9	1080	1606～2142	2181～2908	2968～3958	3812～5082	4933～6577

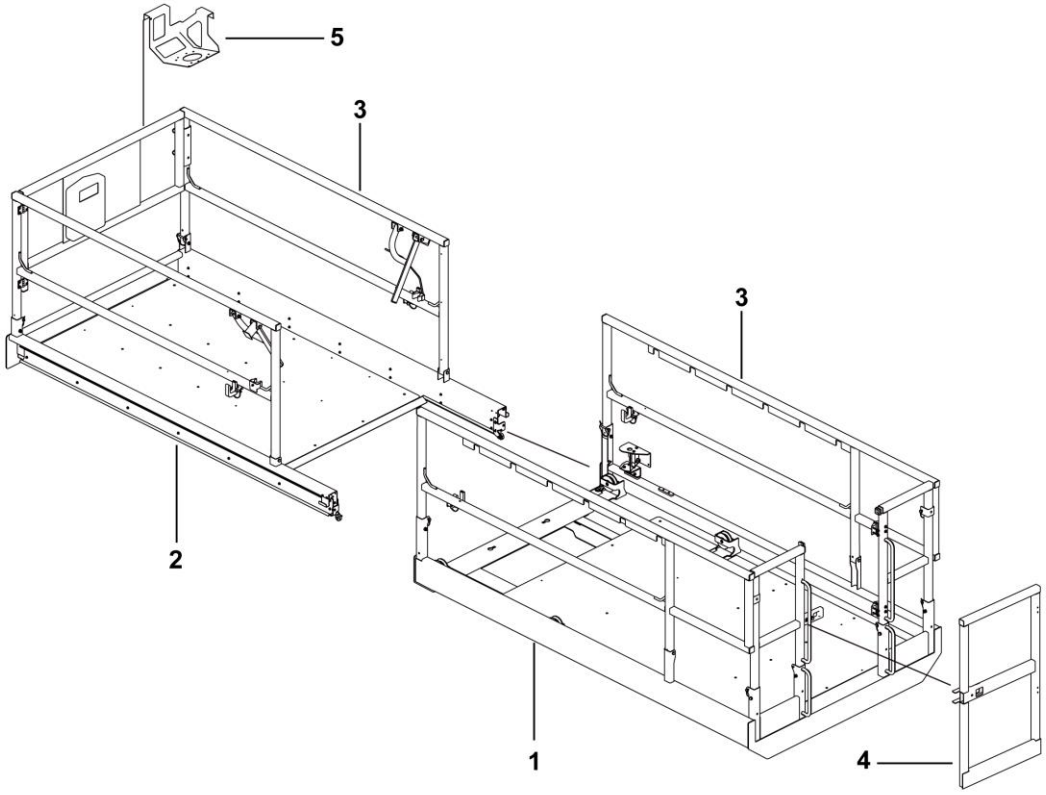
2.3 Key component moment table

No.	Part	Torque Valve		Interval Hours (h)
		Ft. lbs	Nm	
1	Assembling of walking reducer	225±18	295±25	100
2	Assembling of wheel	225±18	295±25	100
3	Hoisting of platform assembly	67±7	91±9	100

ChapterⅢ Service

3.1 Platform

The working platform of the off-road scissor lifting platform is mainly composed of main platform, extension platform, guardrail assembly, semi-swing gate and etc. The exploded view of the working platform is shown in the Fig. below:



1. Main platform 2. Extension platform 3. Guardrail assembly 4. Semi-swing gate 5. Support

3.1.1 Removing the working platform

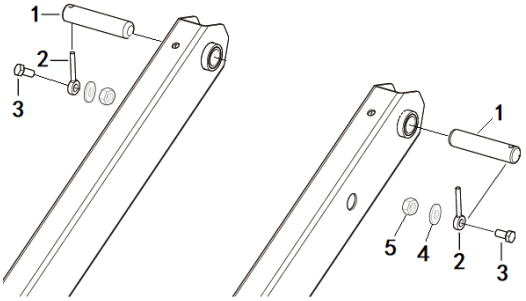


Fig. 3.1 Connection between fork and platform

1.pin 2.Safety pin 3.bolt 4.washer 5.nut

1. Drive the lifting platform to a safe area (with safe operation space available around it, and without fork lifting interference point above it).
2. Pull out the connector between the PCU assembly and the fork PCU harness.
3. Pull the PCU harness out of the platform and put it on the side of the fork (ensure that the harness will not be pressed when the platform is being lifted).
4. As shown above, remove the connecting pin between the main platform and the fork with a special tool.
5. Attach the platform assembly to the sling of traveling crane, and ensure that the sling is connected firmly and reliably. Pass the sling from the inside of the sling fixing point of the guardrail assembly.

Caution：

Lift the platform through the two anchor points on the guardrails on both sides, and lifting by one sling is not allowed.

6. Adjust the traveling crane, and remove the sliders on both sides from the lower bend plate of the main platform.
7. Adjust the position of sling, and lift the platform assembly smoothly to separate it from the fork. Then, place the platform assembly on a structure with sufficient supporting capacity.

3.1.2 Removing the extension platform

Caution:

Only when the platform is in the stowed position and the extension platform is fully retracted and locked in place can this operation be performed.

1. Extend the extension platform by about 1 m.
2. Support the extension platform with a lifting equipment. Do not apply any lifting force.
3. Undo the fasteners on each wheel carrier of the platform, and remove the wheel carrier from the machine.
4. Remove the platform pulley from the machine.
5. Carefully slide the extension platform off the platform, and place it on a structure with sufficient supporting capacity.

CAUTION: Risk of crushing.

If not properly supported and secured during removal, the extension platform may be out of balance and fall off.

3.1.3 Subassembling the extension platform

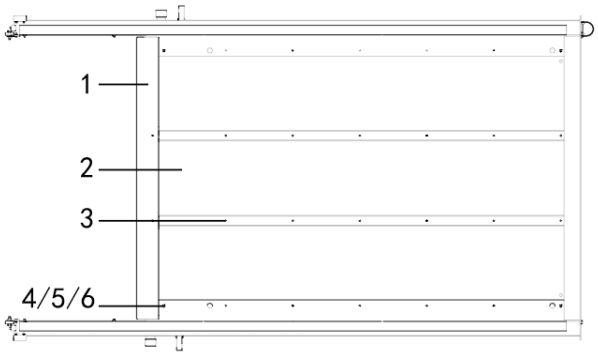


Fig. 3.2 Extension platform floor

1. Extension platform base plate weldment 2. Extension platform base plate 3. Blind rivet 4. Bolt 5. Nut 6. Washer

1. Hoist part 1 to tooling with sling, and be careful during the hoisting.

2. Install the base plate (2) on the extension platform weldment (1) with blind rivets (3), and fix the four corners of each base plate with parts 4, 5 and 6.

Reference tightening torque of part 4: 12±1N•m

Tools: socket wrench 10, torque wrench QSP25N3, open-end ratchet wrench 10-10, pneumatic riveting gun.

CAUTION:

The shank of the blind rivet shall not be higher than aluminum plate.

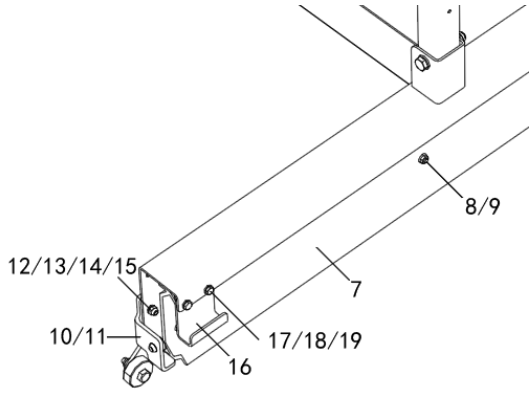


Fig. 3.3 Extension platform assembly

7. Guide rail 8. Bolt 9. Nut 10. Left limit plate 11. Right limit plate 12. Bolt 13. Washer 14. Washer 15. Nut 16. Bend plate assembly 17. Bolt 18. Washer 20. Nut

3. Assemble part 7 on part 1 with part 8/9.
4. Assemble parts 10/11 to both sides of the extension platform with parts 12/13/14/15;
5. Assemble part 16 on both sides of part 1 with part 17/18/19.
6. After the limit plate is installed, ensure that the roller comes in contact with the bottom surface of the platform without suspension.

Reference torque of part 8/12/17: 12±1N•m;

Tools: socket wrench 10; torque wrench QSP25N3; open-end wrench 8-10; ratchet torque wrench QSP50N3; hexagon head socket wrench M8.

3.1.4 Main platform assembly

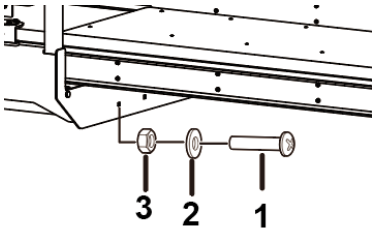


Fig. 0.1 Platform assembly

1.Bolt 2.Washer 3.Nut

1. First, insert the sliders on both sides of the fork into the openings below the platform, and then push the platform to make the platform fall on the fork;

CAUTION:Before lowering the platform, determine the front and rear ends of the platform to avoid reverse installation;

2. Fix the platform on the fork with parts 1, 2 and 3, and tighten it to the specified torque;

CAUTION: After the slider is clamped into the platform, it is necessary to check the gap between the slider and the edge of the platform slideway, and if the gap is greater than 1mm/0.04in, adjust the gap with plate. Ensure that the adjustments on both sides are uniform, and adjustment on one side only is not allowed.

Reference tightening torque of part 1: 90±9N•m;

Tools: ratchet torque QSP200, socket wrench 1/2 18.

3.1.5 Folding the working platform guardrail

The platform guardrail system consists of the extension platform folding guardrail and the main platform folding guardrail, which are fixed in place by D-pins.

1. Lower the platform completely and lock the extension platform.
2. Remove the platform control unit;
3. Remove the guide blocks on both sides of

the main platform guardrail and the extension platform guardrail from the platform guardrail.

4. Remove the two D-pins at the front guardrail of extension platform.
5. Turn the front guardrail of the extension platform inward always with hands not putting on the places with risk of pinching, and meanwhile, prevent the left and right guardrails of the extension platform from overturning;
6. Install the two removed D-pins back to the front guardrail bracket;
7. Turn the left/right guardrail of the extension platform inward always with hands not putting on the places with risk of pinching;
8. Remove the two D-pins on the left/right upper part of the main platform door guardrail;
9. Push the door guardrail inward from the ladder or the ground always with hands not putting on the places with risk of pinching, and meanwhile, prevent the left and right guardrails of the main platform from overturning;
10. Push the left/right guardrail of main platform inward from the ladder or the ground always with hands not putting on the places with risk of pinching;
11. Install the two removed D-pins back to the guardrail bracket on each side.

3.2 Platform control unit (PCU)

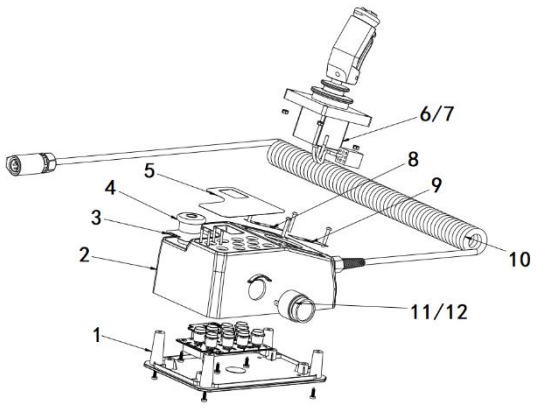


Fig. 3.5 Platform control unit

S/N	Name
1	Bottom cover 20020107
2	Housing 120020109
3	Emergency stop indication panel 20020108
4	Emergency stop switch 10420049
5	U.S. standard operation panel 20020248
6	Hall joystick 10480012
7	Joystick adapter harness 10470114
8	Joystick forward/backward indication 20020091
9	Joystick leftward/rightward indication 20020092
10	Spring harness 10470083
11	Buzzer 10430003
12	Buzzer harness 10470100

3.2.1 Removing the platform control unit

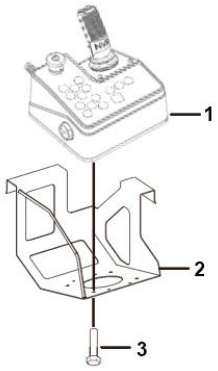


Fig. 0.2 platform control unit

1. PCU 2.PCU bracket welded 3.Bolt

1. As shown below, remove the bolts to separate the bracket from the PCU, and disconnect the PCU harness from the ground control unit to remove the PCU.
2. Removing the platform circuit board
   a. Loosen the fasteners for fixing the PCU cover Open the PCU cover.
   b. Visually locate the circuit board installed on the inside of the PCU cover.
   c. Fix the PCU cover in a horizontal position.

WARNING: Risk of electric shock/ burning.

The contact with a live circuit may result in death or serious personal injury. Be sure to remove the ring, watch and other ornaments.

CAUTION: Risk of part damage.

Electrostatic discharge can damage circuit board components. Therefore, when performing any operation to the circuit board, keep a firm contact with the metal part on the machine that is always grounded, or use a grounded wristband.

d. Mark and disconnect the harness connectors on the PCU circuit board.
e. Carefully remove the fasteners for fixing the PCU circuit board.
f. Carefully remove the circuit board from the PCU.

3.2.2 Assembling the platform control unit (PCU)

1. As shown in Fig. 3.7, install the PCU (part 1) onto the bracket (part 2), and tighten it with bolt (part 3).
2. Fix the PCU harness at the bracket.
3. Connect the connector of the PCU assembly to the PCU harness connector and install it firmly.

3.3 The platform gate

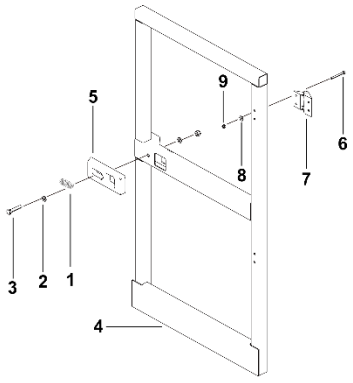


Fig. 0.3 The platform gate

1. Spring 2. Washer 3. Bolt
4. Swing gate weldment 5. Plastic block
6. Bolt 7. Hinge 8. Washer 9. Nut

3.3.1 Removing the semi-swing gate

1. As shown above, remove the fastener for fixing part 7 on the gate, remove the spring hinge (7), and slowly take down the swing gate from the guardrail.
2. Undo the fasteners such as bolts (3), and remove plastic block (5) and spring (1).

3.3.2 Installing the semi-swing gate

1. Install the plastic block (5) and spring (1) into swing gate and tighten them with bolts and washers. Pay attention that the plastic block is to be slightly tightened so that it can slide smoothly.
2. Fix the semi-swing gate on the platform with the spring hinge (7), and tighten it with parts 9, 6 and 8.
3. During assembling, keep the lower edge of the gate in parallel with the main platform base plate, and open and close the gate to check that it operates smoothly without seizure, and check that the gate, after being opened, can spring back to its original position freely and can be locked properly and limited reliably. After the installation is completed, check that the swing gate swings smoothly without seizure.

3.4 Removing and installing the fork

3.4.1 Removing the fork (SR3369E)

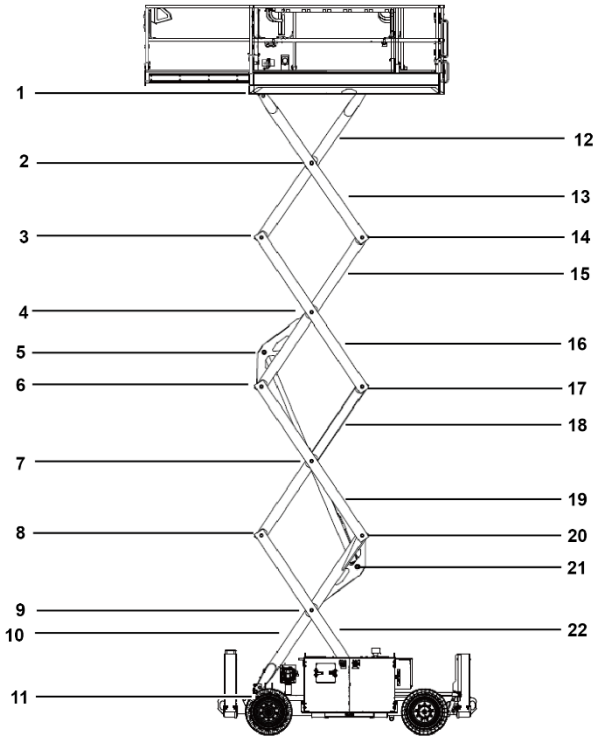


Fig. 3.8 SR3369E fork assembly

1. 5# pin
2. 5# center pin
3. 5# pin (steering end)
4. 3# center pin
5. Lower lift cylinder rod end shaft
6. 3# pin (steering end)
7. 2# center pin
8. 2# pin (steering end)
9. 1# center pin
10. First inner arm
11. 1# pin
12. Fifth inner arm
13. Fifth outer arm
14. 5# pin (non-steering end)
15. Third inner arm
16. Third outer arm
17. 3# pin (non-steering end)
18. Second inner arm
19. Second outer arm
20. 2# pin (non-steering end)
21. Lower lift cylinder tube end shaft
22. First outer arm

WARNING: Risk of personal injury

This procedure requires specific maintenance skills, lifting equipment and a suitable workshop. Carrying out this process without these skills and tools may result in death or serious injury, as well as serious component damage. Therefore, it is strongly recommended that this service is performed by dealers.

CAUTION:

The O-ring (if any) of the removed fitting and hose assembly must be replaced. During installation, all connections must be tightened to specified torque. Please refer to the specification for selection of tightening torque of the lifting platform.

1. Remove the platform.

CAUTION: Risk of part damage

If being kinked or squeezed, the cables may be damaged.

2. Attach the access ladder to an appropriate lifting equipment, remove the fasteners from the access ladder, and then remove the access ladder from the machine.
3. Remove the cables and harnesses from the wiring board of fifth inner arm and set them aside.
4. Attach the sling on the crane to the fifth outer arm on the left and right sides of the machine.
5. Remove the fasteners that fix the 5# center pin.
6. Remove the wiring board of fifth inner arm.
7. Undo the fasteners that fix the 5# center pin from the machine, and remove the 5# center pin using a soft metal hammer.
8. Remove the fasteners that fix the 5# pin from the non-steering end of the machine.
9. Remove the 5# pin from the non-steering end of the machine using a soft metal hammer. Remove the fifth outer arm from the machine.

WARNING: Risk of crushing

If not properly supported during removal, the fifth outer arm may be out of balance and fall off.

10. Attach the sling of crane to the fifth inner arm.
11. Remove the fasteners that fix the 5# pin.
12. Remove the 5# pin from the steering end using a soft metal hammer. Remove the fifth inner arm from the machine.
13. Remove the cables and harnesses from the wiring board and the wiring ring of third inner arm and set them aside.

CAUTION: Risk of part damage

If being kinked or squeezed, the cables may be damaged.

14. Attach the sling of the crane to the third outer arm.
15. Remove the fasteners that fix the 3# center pin.
16. Remove the wiring board of third arm, and take it down from the machine.
17. Remove the 3# center pin using a soft metal hammer.

WARNING: Risk of crushing

If not properly supported during removal, the third outer arm may be out of balance and fall off.

18. Knock out the 3# pin at the non-steering end of the machine by a half using a soft metal hammer, and then remove the third outer arm.
19. Attach the sling of crane to the lift cylinder rod end without applying any lifting pressure.
20. Remove the fasteners that fix the lift cylinder rod end shaft from the machine. Remove the

pin using a soft metal hammer, and lower the cylinder to the first inner arm.

WARNING: Risk of personal injury.

If not properly supported during removal of cylinder rod end shaft, the cylinder may fall off.

21. Attach the sling of crane to the third inner arm.
22. Remove the fasteners that fix the 3# pin at the steering end.
23. Remove the 3# center pin using a soft metal hammer, and remove the third inner arm from the machine.

WARNING: Risk of crushing

If not properly supported during removal, the third inner arm may be out of balance and fall off.

24. Remove the fasteners that fix the 2# center pin.
25. Remove the cables and harnesses from the wiring board and the wiring ring of second arm and set them aside.
26. Remove the wiring board of second arm from the machine.
27. Attach the sling of the crane to the second outer arm.
28. Remove the 2# center pin using a soft metal hammer.
29. Remove the fasteners that fix the 2# pin at the non-steering end of the machine.
30. Knock out the 2# pin at the non-steering end of the machine by a half using a soft metal hammer, and then remove the second outer arm.
31. Attach the sling of the crane to the second outer arm.
32. Remove the fasteners that fix the 2# center pin.
33. Remove the 2# center pin using a soft metal hammer.
34. At the non-steering end of the machine, tap the 2# pin on the other side using a soft metal hammer, and then remove the second outer arm.

WARNING: Risk of personal injury.

If not properly supported during removal, the second outer arm on the ground control unit side may be out of balance and fall off.

35. Remove the 2# pin at the non-steering end of the machine.
36. Attach the sling of the crane to the second inner arm.
37. Remove the fasteners that fix the 2# pin from the steering end of the machine.
38. Remove the 2# pin using a soft metal hammer. Remove the second inner arm from the machine.

WARNING: Risk of crushing

If not properly supported during removal, the second inner arm may be out of balance and fall off.

39. Remove the protective arm from the second inner arm that has been removed.

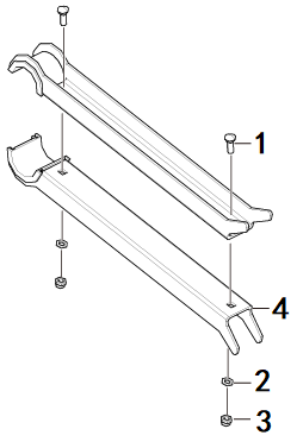


Fig. 3.9 Protective arm assembly

1. Bolt 2. Washer 3. Nut 4. Bend plate assembly

40. Attach the sling of the traveling crane to the

first inner arm.

41. Lift the first inner arm by about 60cm, and support the safety arm between the first inner arm and the first outer arm at the non-steering end of the machine. Lower the fork to the safety arm.

⚠ WARNING: Risk of personal injury.

When the fork is being lowered to the safety arm, keep your hand away from the moving parts.

42. Attach the sling of the traveling crane to the lift cylinder rod end. Lift the lift cylinder by about 1 m (3.28ft).
43. Mark, disconnect and plug the hydraulic hose of lift cylinder. Cover the fittings on the cylinder.

⚠ WARNING: Risk of personal injury.

Splashed hydraulic oil will penetrate and burn the skin. Therefore, please loosen hydraulic connectors very slowly to reduce the oil pressure gradually. Prevent the oil from spraying or ejection.

44. Mark and disconnect the harness on the cylinder valve.
45. Lift the lift cylinder to a vertical position.
46. Remove the fasteners that fix the pin from the lift cylinder tube end shaft, knock out the pin using a soft metal hammer, and remove the lift cylinder from the machine.

⚠ WARNING: Risk of crushing

If not properly supported and fixed to the lifting equipment, the lift cylinder may be out of balance and fall off.

⚠ CAUTION: Risk of part damage

When removing the cylinder from the machine, be careful not to damage the valve or joint on the cylinder.

47. Place a 10cm×10cm×1.2m block under the 1# center pin across both sides of the chassis.
48. Attach the sling of the traveling crane to the first inner arm at the non-steering end. Lift the first inner arm and remove the safety arm. Place the first inner arm on the cushion block placed on the chassis.
49. Remove the cable from the wiring ring of the first arm and set it aside.

⚠ CAUTION: Risk of part damage

If being kinked or squeezed, the cables may be damaged.

50. Support the ladder and attach it to an appropriate lifting equipment.

⚠ WARNING: Risk of crushing

If not properly supported and fixed to the lifting equipment, the ladder may fall off.

51. Remove the fasteners from the ladder, and then remove the ladder from the machine.
52. Attach the sling of the traveling crane to the first outer arm. Do not apply any lifting force.
53. Remove the fasteners that fix the 1# center pin.
54. Remove the 1# center pins on both sides using a soft metal hammer.

⚠ WARNING: Risk of personal injury.

If not properly supported during removal of pin, the first outer arm may be out of balance and fall off.

55. Slide the first outer arm to the non-steering end and remove it from the machine.
56. Attach the sling of the traveling crane to the first inner arm without lifting.
57. Remove the fasteners that fix the travel switch cover on the first inner arm, and

remove the cover.

58. Disconnect the upper and lower limit travel switch connecting wires, and remove the travel switch and the travel switch mounting plate.
59. Remove the fasteners that fix the pin for connecting the first inner arm to the end of the chassis. Remove the pin.
60. Remove the first inner arm from the machine.

CAUTION: Risk of part damage

Be careful not to damage the limit switch when removing the first inner arm from the machine.

WARNING: Risk of personal injury.

If not properly supported during removal of first inner arm from the machine, the first outer arm may be out of balance and fall off.

3.4.2 Removing the fork (SR4069E)

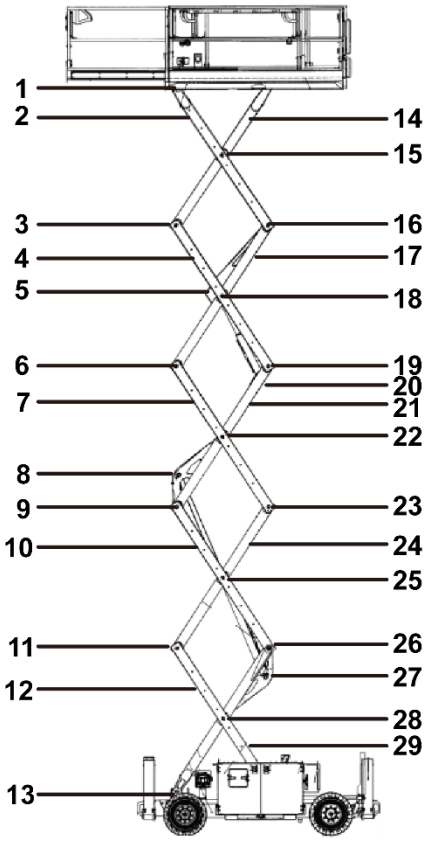


Fig. 3.10 SR4069E fork assembly

1. 5# pin
2. Fifth outer arm
3. 5# pin (steering end)
4. Third outer arm
5. Upper lift cylinder rod end shaft
6. 3# pin (steering end)
7. Third outer arm
8. Lower lift cylinder rod end shaft
9. 3# pin (steering end)
10. Second outer arm
11. 2# pin (steering end)
12. First inner arm
13. 1# pin (steering end)
14. Fifth inner arm
15. 5# center pin
16. 5# pin (non-steering end)
17. Third inner arm
18. 3# center pin
19. 3# pin (non-steering end)
20. Upper lift cylinder tube end shaft
21. Third inner arm
22. 3# center pin
23. 3# pin (non-steering end)
24. Second inner arm
25. 2# center pin
26. 2# pin (non-steering end)
27. Lower lift cylinder tube end shaft
28. 1# center pin
29. First outer arm

⚠ WARNING: Risk of personal injury

This procedure requires specific maintenance skills, lifting equipment and a suitable workshop. Carrying out this process without these skills and tools may result in death or serious injury, as well as serious component damage. Therefore, it is strongly recommended that this service is performed by dealers.

⚠ CAUTION:

The O-ring (if any) of the removed fitting and hose assembly must be replaced. During installation, all connections must be tightened to specified torque. Please refer to the specification for selection of tightening torque of the lifting platform.

1. Remove the platform.
2. Support and attach the access ladder to an appropriate lifting equipment, remove the fasteners from the access ladder, and then remove the access ladder from the machine.
3. Remove the cables and harnesses from the wiring ring of the fifth outer arm and the wiring board of the fifth inner arm, and set them aside.
4. Remove the wiring boards of the fourth to fifth arms from the machine.
5. Attach the sling of the crane to the fifth outer arm.
6. Remove the fasteners that fix the 5# center pin.
7. Knock out the 5# center pin using a soft metal hammer and remove it from the machine.
8. Remove the fasteners that fix the 5# pin at the non-steering end.
9. Remove the 5# pin from the non-steering end of the machine using a soft metal hammer. Remove the fifth outer arm from the machine.

⚠ WARNING: Risk of personal injury.

If not properly supported during removal, the fifth outer arm may be out of balance and fall off.

⚠ WARNING: Risk of crushing

If not properly supported during removal of cylinder rod end pin, the cylinder may fall off.

⚠ WARNING: Risk of personal injury.

If not properly supported during removal, the fourth outer arm may be out of balance and fall off.

10. Attach the sling of the traveling crane to the fifth inner arm.
11. Remove the fasteners that fix the 5# pin (4) at the steering end of the machine.
12. Remove the 5# pin from the steering end of the machine using a soft metal hammer. Remove the fifth inner arm from the machine.
13. Mark, disconnect and plug the hydraulic hose of upper lift cylinder, Cover the fittings on the cylinder.
14. Mark and disconnect the harness of the cylinder valve block.
15. Attach the sling of the traveling crane to upper lift cylinder rod end.
16. Remove the fasteners that fix the upper lift cylinder rod end pin.
17. Remove the upper lift cylinder rod end pin from the machine using a soft metal hammer.
18. Attach the sling of the traveling crane to the lug of the upper lift cylinder rod end.
19. Lift the lift cylinder to a vertical position.
20. Remove the fasteners that fix the lift cylinder tube end pin. Remove the upper lift cylinder from the machine.

WARNING: Risk of crushing

If not properly supported during removal of cylinder tube end pin, the cylinder may fall off.

CAUTION: Risk of part damage

When removing the cylinder from the machine, be careful not to damage the valve or joint on the cylinder.

21. Remove the fasteners that fix the 3# center pin.
22. Remove the cables and harnesses from the wiring board of the third inner arm, and set them aside.
23. Remove the fasteners that fix the wiring board of the third inner arm, and remove the third to fourth wiring boards.
24. Remove the 3# center pin using a soft metal hammer.
25. Remove the fasteners that fix the 3# pin from the non-steering end.
26. Remove the 3# pin from the non-steering end of the machine using a soft metal hammer. Remove the third outer arm from the machine, and remove the third outer arm on the other side in the same way.

WARNING: Risk of crushing.

If not properly supported during removal, the fourth outer arm may be out of balance and fall off.

27. Attach the sling of the traveling crane to the third inner arm.
28. Remove the fasteners that fix the 3# pin from the steering end of the machine.
29. Remove the 3# pin from the steering end of the machine using a soft metal hammer. Remove the third inner arm from the machine.
30. Attach the sling of the traveling crane to the third outer arm.
31. Remove the fasteners that fix the 3# center pin.
32. Remove the 3# center pin using a soft metal hammer.
33. Remove the fasteners that fix the 3# pin from the non-steering end.
34. Remove the 3# pin from the non-steering end of the machine using a soft metal hammer. Remove the third outer arms on both sides of the machine.
35. Remove the cables and harnesses and hydraulic hoses from the wiring board and the wiring ring of the third inner arm.
36. Remove the fasteners that fix the wiring boards of the second to third arms, and remove the wiring boards.

WARNING: Risk of personal injury.

If not properly supported during removal, the third outer arm may be out of balance and fall off.

37. Attach the sling of the traveling crane to lower lift cylinder rod end.
38. Remove the fasteners that fix the lower lift cylinder rod end pin.
39. Remove the lower lift cylinder rod end pin from the machine using a soft metal hammer.
40. Place a 10 x 10 x 25 cm cushion block on the first inner arm cylinder plate.

WARNING: Risk of personal injury.

When lowering the cylinder, do not touch the moving parts with hands.

41. Lower the cylinder to the cushion block.
42. Attach the sling of the traveling crane to the third inner arm.
43. Remove the fasteners that fix the 3# pin from the steering end of the machine.
44. Remove the 3# pin from the steering end of

the machine using a soft metal hammer. Remove the third inner arm from the machine.

45. Attach the sling of the traveling crane to the second outer arm.
46. Remove the fasteners that fix the 2# center pins on both sides of the machine.
47. Remove the 2# center pin on both sides of the machine using a soft metal hammer.
48. Remove the fasteners that fix the 2# pin at the non-steering end.
49. Remove the 2# pin from the non-steering end of the machine using a soft metal hammer. Remove the second outer arms on both sides of the machine.

WARNING: Risk of crushing

If not properly supported during removal, the second outer arm may be out of balance and fall off.

50. Remove the cables and harnesses and hoses from the wiring boards of the second to third arms, and set them aside.
51. Remove the fasteners that fix the wiring boards of the first to second arms, and remove the wiring boards.
52. Attach the sling of the crane to the second inner arm. Lift the arm to a vertical position.
53. Remove the fasteners that fix the 2# pin from the steering end of the machine.
54. Remove the 2# pin from the steering end of the machine using a soft metal hammer. Remove the second inner arm from the machine.
55. Remove the cables and harnesses and hydraulic hoses from the wiring ring of the first inner arm.
56. Attach the sling of the traveling crane to the first inner arm, and lift it by 60cm.
57. Place a 10cm x 10cm x 1.2m cushion block under the 1# center pin across both sides of the chassis.
58. Lower the fork onto the cushion block placed on the chassis.

WARNING: Risk of personal injury.

When lowering the cylinder, do not touch the moving parts with hands.

59. Attach the sling of the traveling crane to the lower lift cylinder.
60. Mark, disconnect and plug the hydraulic hose of the lower lift cylinder. Cover the fittings on the cylinder.

WARNING: Risk of personal injury.

Splashed hydraulic oil will penetrate and burn the skin. Therefore, please loosen hydraulic connectors very slowly to reduce the oil pressure gradually. Prevent the oil from spraying or ejection.

61. Mark and disconnect the harnesses and hoses of the cylinder valve.
62. Mark and disconnect the harnesses of the platform overload sensor.
63. Lift the lift cylinder to a vertical position.
64. Remove the fasteners that fix the lift cylinder tube end pin. Remove the pin using a soft metal hammer. Remove the lower lift cylinder from the machine.
65. Attach the sling of the traveling crane to the first inner arm.
66. Lift the arm slightly and remove the cushion block.
67. Attach the sling of the traveling crane to the first outer arm. Do not apply any lifting force.
68. Remove the outer snap ring and fasteners that fix the 1# center pin.
69. Remove the 1# center pin using a soft metal hammer.
70. Slide the first outer arm to the non-steering end and remove it from the machine.

71. Attach the sling of the traveling crane to the first inner arm without lifting.
72. Remove the fasteners that fix the travel switch cover on the first inner arm, and remove cover from the machine.
73. Remove the fasteners of the lower limit switch mounting plate, disconnect the limit switch connection line, and remove the lower limit switch and the mounting plate from the machine.
74. Remove the fasteners that fix the pin for connecting the first inner arm to the end of the chassis. Remove the pin.
75. Remove the first inner arm from the machine.

WARNING: Risk of personal injury.

1. If not properly supported during removal, the first inner and outer arms may be out of balance and fall off.

2. Be careful not to damage the limit switch when removing the first inner and outer arms from the machine.

3.4.3 Assembling the fork

1. Assembling the first fork

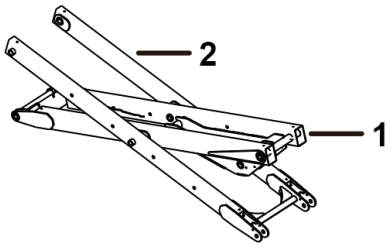


Fig. 3.11 First fork

1. First inner arm assembly 2. First outer arm weldment

a. Hoist the first outer arm and the first inner arm to the fork subassembling area;

CAUTION:

- **Place the first outer arm first, and keep it centered and its rear end placed firmly as shown;**
- **Pay attention to the direction of the upper, lower and front and rear ends of the inner and outer arms.**
- **Prevent the part from being lifted above any personnel, and during the lifting, keep the part in balance. The operator shall stay at a certain distance from the part, and hold the part at its outer side or other places where crushing is impossible.**
- **Follow the requirements herein for hoisting of forks of subsequent layers.**

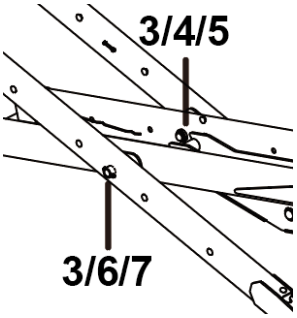


Fig. 3.12 First fork assembly

3. Pin 4. Washer 5. Retaining ring 6. Nut 7. Bolt

b. Connect the middle positions of the first inner arm and first outer arm with part 3;

CAUTION: For each layer, direct the large chamfered end of the shaft inward, and insert both ends of shaft from outside to inside.

c. Install parts 6/7 to the outer end of the fork (3) and parts 4/5 to the inner end of the fork (3) as shown; confirm that the retaining ring is clamped in place;

CAUTION: As no wiring board is installed at the position of part 4, it is required to install 2 pieces of part 4, and for forks of other layers where a wiring board is installed, it is only required to install 1 washer and secure it with a retaining ring.

Reference tightening torque of part 7: 52±5N•m;

Tools: copper rod; circlip pliers; ratchet torque wrench; socket wrench; electric

impact wrench; open-end wrench.

2. Assembling the lower lift cylinder

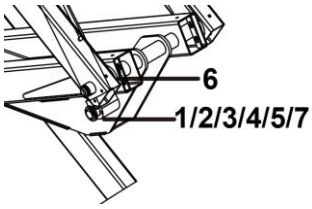


Fig. 3.13 Lower lift cylinder assembly

1. Pin 2. Bolt 3. Thick washer 4. Nut 5. Safety pin 6. Washer 7. Washer

a. Use the traveling crane to hoist the cylinder with the mounting holes at the bottom of cylinder aligned with the holes on the first inner arm, fix the cylinder with part 1, and separate the bottom of the cylinder from the inner side of the first inner arm with part 6.

b. After fixing the lower part of the cylinder with a shaft, fix the pin with parts 2/3/4/5/7;

Reference tightening torque of part 2: 90±9N•m;

Tools: copper rod; ratchet wrench; socket wrench; open-end wrench.

3. Assembling the wiring board of first fork

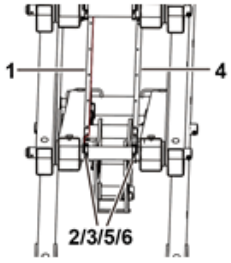


Fig. 3.14 First fork wiring board assembly

1. Left wiring board assembly 2. Retaining ring 3. Retaining ring 4. Right wiring board assembly 5. Screw 6. Screw

a. Fix the part 1 to the end of first inner arm weldment and the center pin of second inner arm, and secure at the center pin with a retaining ring.

b. Install parts 2 and 3 to the left and right sides of the round steel with parts 5 and 6, and pay attention that the fixing screws are only required to be manually screwed into the mounting holes.

Tools: Phillips screwdriver, hexagon socket set

4. Assembling the second fork

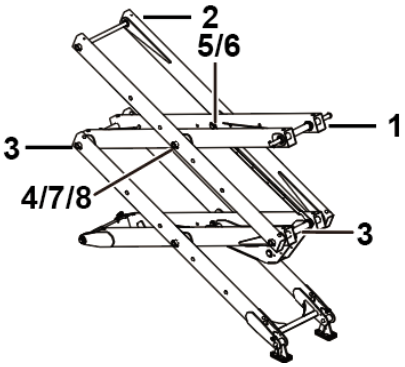


Fig. 3.15 Second fork assembly

1. Second inner arm assembly 2. Second outer arm assembly 3. Shaft 4. Shaft 5. Washer 6. Retaining ring 7. Nut 8. Bolt

a. Assemble the side of part 1 close to the upper end of the cylinder to the first outer arm with part 3;

b. Assemble part 1 and part 2 together with part 4, and fix the outer side of part 4 with parts 7/8 and the inner side with parts 5/6;

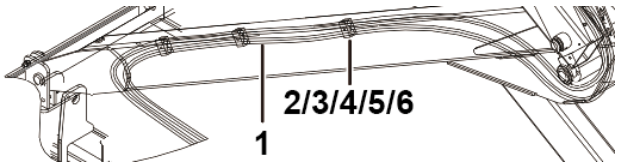
c. Assemble the end of part 2 close to the lower end of the cylinder to the first inner arm with part 3;

d. Fix the outer side of part 3 with parts 7/8, and the inner side with parts 5/6;

Tightening torque of part 8: 52±5N•m;

Tools: torque wrench; circlip pliers; socket wrench; electric impact wrench.

5. Routing the lower cylinder oil pipes



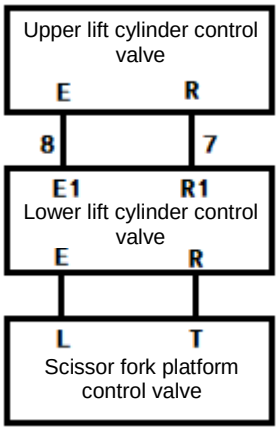


Fig. 3.16 Routing the lower cylinder oil pipes

1. Hose 2. Pressure plate 3. Pipe clamp 4. Bolt 5. Nut 6. Washer 7. Hose 8. Hose

a. Assemble the part 1 to port E and port R at the lower end of the lower cylinder control valve;

b. Lay the oil pipe along the cylinder and curve it at the lower end of the cylinder as shown, then lay it along the fork on the left side of cylinder, fix it on the left side of fork with parts 2/3/4/5/6 (as shown).

c. Install part 7 and part 8 to port R1 and port E1 of the lower cylinder valve block respectively, and mark E1 and R1 on the other end of the oil pipe respectively for the convenience of subsequent connection.

d. Ensure that the ties are spaced by at least 300mm, and the section of oil pipe between ties does not sag.

e. Wrap the curve of pipe with PVC tape and the ends of pipe with 2-3 turns of black insulating tape, and keep the outer end of the curve of pipe about 50mm away from the edge of the fork rectangular tube.

Reference tightening torque of part 1: 42±4N•m;

Reference tightening torque of part 7: 32±3N•m;

Reference tightening torque of part 8: 42±4N•m;

Tools: electric impact wrench 51073C, socket wrench, needle-nosed pliers, torque wrench SP67N×22, open-end wrench 13-16, torque wrench SP67N*24.

6. Assembling the safety support

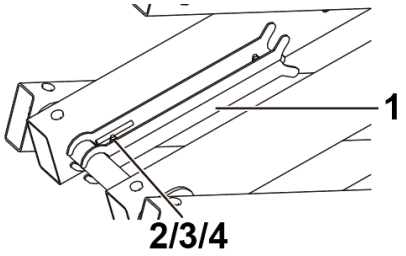


Fig. 3.17 Safety support assembly

1. Bend plate assembly 2. Bolt 3. Washer 4. Nut

a. Pre-assemble part 1 to the second inner arm with parts 2/3/4, and when it fits the left support frame, tighten the bolts;

b. After assembling, test whether the safety support can be placed on the left support as shown;

c. When assembling the protective arm, direct the nut outward.

Reference tightening torque of part 2: 52±5N•m;

Tools: open-end wrench 16-18, ratchet torque wrench QSP100, socket wrench 1/2-16mm.

7. Assembling the third fork and lower cylinder

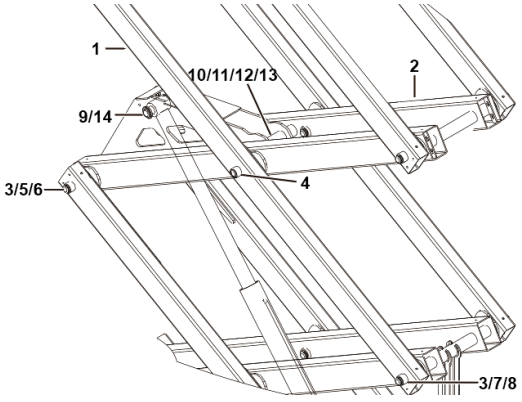


Fig. 3.18 Assembling the third fork and lower cylinder

1. Third outer arm weldment 2. Third inner arm assembly 3. Shaft 4. Shaft 5. Bolt 6. Nut 7. Retaining ring 8. Washer 9. Shaft 10. Washer 11. Bolt 12. Thick washer 13. Nut 14. Safety pin

a. Hoist the third outer arm and the third inner arm above the second inner arm and second outer arm;
b. Connect the part 2 to the second outer arm with part 3, and connect the part 1 with the second inner arm;
c. Assemble part 1 and part 2 together with part 4, and fix the outer side of the fork with parts 5/6 and the inner side with parts 7/8;
d. Fix the shaft (3) with parts 4/5, and clamp the other end with parts 7/8;

CAUTION: Before fixing with parts 4/5, it is required to fix the other side of the shaft with bolts to ensure an overall consistence.

e. Assemble the upper end of the lower cylinder to part 2 with part 9, and separate the fixing hole at the upper end of the cylinder from the inner side of fork with part 10;
f. After the part 9 is in place, fix the shaft with parts 11/12/13/14 and tighten it to the specified torque;

CAUTION: Do not forget to install the washer between the fixing hole at the upper end of the cylinder and the inner side of the fork; install a thick washer between the safety pin and the fork.

Reference tightening torque of part 11: 90±9N•m

Tools: copper rod, ratchet torque wrench QSP200, socket wrench 1/2 18, open-end wrench 16-18

8. Assembling the wiring board of third fork

a. The assembling method of the third fork wiring board is the same as that of the second fork wiring board.

9. Assembling the fourth fork (SR3369E)

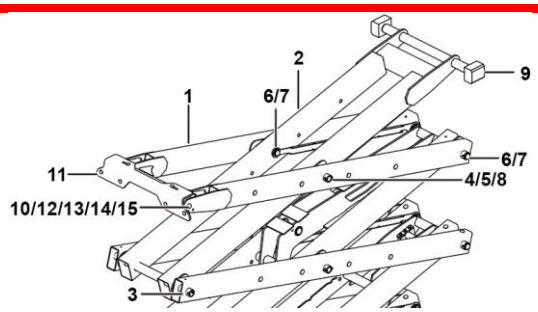
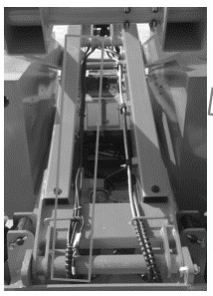


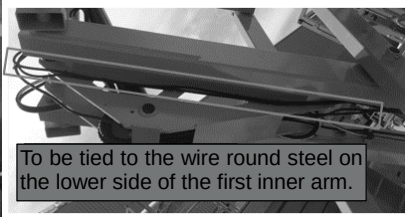
Fig. 3.19 Fourth fork assembly (SR3369E)

1. Fifth outer arm weldment 2. Fifth inner arm assembly 3. Shaft 4. Nut 5. Bolt 6. Retaining ring 7. Washer 8. Shaft 9. Slider 10. Shaft 11. Upper mount assembly 12. Safety pin 13. Bolt 14. Nut 15. Washer

a. Connect the part 1 to the fourth inner arm with part 3, fix the part 3 on the fork with parts 4/5, and clamp the part 3 on the other side of the fork with parts 6/7;
b. Connect the part 2 to the fourth outer arm with part 3, fix the part 3 on the fork with parts 4/5, and clamp the part 3 on the other side of the fork with parts 6/7;
c. Fix part 1 and part 2 together with part 8, fix the end of part 8 on the outer side of the fork with parts 4/5, and clamp the inner side of the fork with parts 6/7;
d. Assemble the part 9 at both ends where the fourth inner arm is fixed;
e. Assemble part 11 to the double lug of fourth outer arm with part 10, fix part 10 with parts 12/13/14/15, and tighten it to the specified torque;

10. Routing and tying the harness (SR3369E)





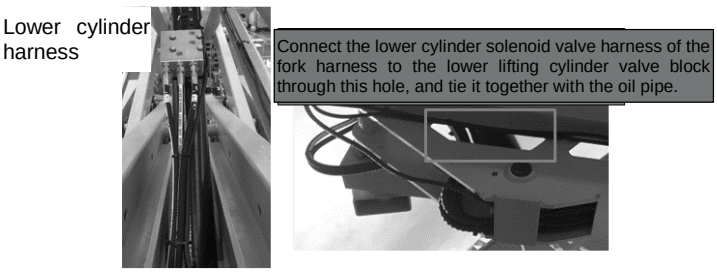


Fig. 3.20 Routing and tying the harness (SR3369E)

a. Keep the harness and oil pipe at the fork in the same direction, with the oil pipe on the left side of fork and the harness on the right side of fork. See the figure for the specific routing direction. After the harness is routed to the fourth fork and through the wiring board, throw it directly out from the upper part of the intermediate shaft of the fork, and keep the reserved harness about 50mm away from the fork surface.

b. Fix the harness into all the fixing holes on the wiring board with ties, keep the ties on the routing round steel spaced by 300mm, and ensure that the harness does not sag at any position.

c. Secure the two oil pipes of the lower lift cylinder with ties every 300mm from the position 100mm away from the oil pipe joint to the position where the oil pipe is bent.

d. At each curve, keep the outermost side of the curve about 50mm away from the round steel and the pin, and use PVC tape to protect the oil pipe, in which case wrapping of single harness is not required.

CAUTION: If the platform power harness needs to be assembled, keep its direction consistent with the PCU harness.

11. Assembling the fourth fork and upper cylinder (SR4069E)

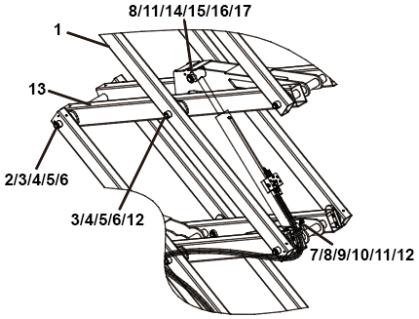


Figure 3.21 Assembling the fourth fork and upper cylinder (SR4069E)

1. Third outer arm weldment 2. Shaft 3. Bolt 4. Nut 5. Retaining ring 6. Washer 7. Pin pressure plate 8. Washer. 9. Bolt 10. Shaft 11. Bolt 12. Washer 13. Fourth inner arm assembly 14. Shaft 15. Thick washer 16. Bolt 17. Nut

a. Connect part 1 to the third fork inner arm with part 2 first, then fix the part 2 with parts 3/4/5/6, and tighten it to the specified torque. **The position of part 5 and part 6 are the same as those of the forks of the first three layers;**

b. Insert the through hole at the bottom of upper cylinder into the part 10, sleeve the part 8 on the part 10 at the left and right ends of the cylinder, then assemble it to the third inner arm, clamp it with part 7, fix it with parts 9/11/12, and tighten it to the specified torque;

c. Assemble part 13 to the third outer arm with part 2, fix the part 2 on the fork with parts 3/4/5/6, and tighten it to the specified torque;

d. Assemble part 1 to part 13 with part 14, fix part 12 with parts 3/4/5/6, and tighten it to the specified torque;

e. Adjust the position of the upper lift cylinder, assemble the cylinder on the fourth inner arm with parts 8/17, fix part 17 with parts 13/14/15/16, and tighten it to the specified torque;

CAUTION: Do not forget to install the washer between the fixing hole at the upper end of the cylinder and the inner side of the fork; install a

thick washer between the safety pin and the fork.

Reference tightening torque of part 3: 52±5N•m;

Reference tightening torque of parts 9 and 11: 52±5N•m;

Reference tightening torque of part 16: 90±9N•m.

Tools: copper rod, open-end wrench, ratchet wrench, socket wrench, circlip pliers.

12. Assembling the wiring board of fourth fork (SR4069E)

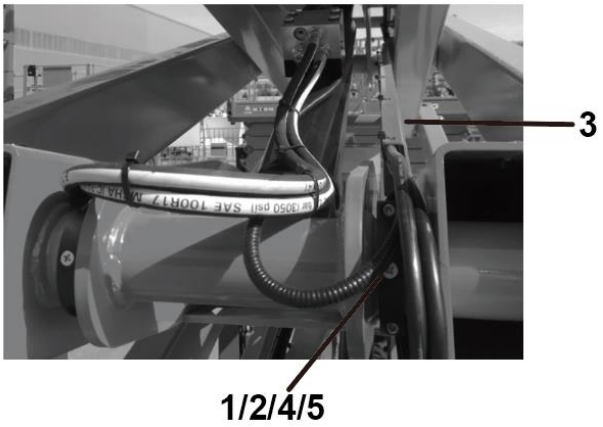


Fig. 3.22 Fourth fork wiring board assembly (SR4069E)

1. Retaining ring 2. Retaining ring 3. Right wiring board assembly 4. Screw 5. Screw

a. Fix the part 3 to the third inner arm round steel and the connecting shaft between the fourth inner arm and the fourth outer arm, and secure at the connecting shaft with retaining ring. The part 3 is to be fixed on the right side of the fork.

b. Install parts 1 and 2 to the right side of the round steel with parts 4 and 5, and pay attention that the fixing screws are only required to be manually screwed into the mounting holes.

CAUTION: For the location where the wiring board is installed, only one pin washer is required, and for the location where the wiring board is not installed, two washers are required and need to be secured by retaining rings.

13. Routing and connecting oil pipes (SR4069E)

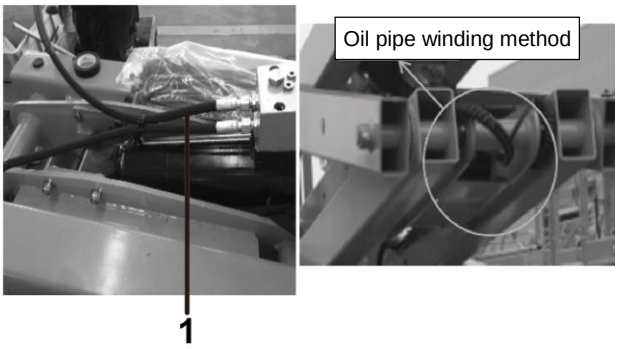


Fig. 3.23 Routing and connecting oil pipes (SR4069E)

1. Hose

a. Connect the part 1 to the designated position of the valve block according to the mark on the oil pipe;

b. Lay the oil pipe along the bottom of the cross beam of fourth inner arm and connect it to the inside of inner arm;

c. Pay attention to the routing direction and winding method of oil pipe, and avoid the pipe from being squeezed.

Reference tightening torque of part 1: 32±3N•m;

Tools: open-end torque wrench

14. Assembling the fifth fork (SR4069E)

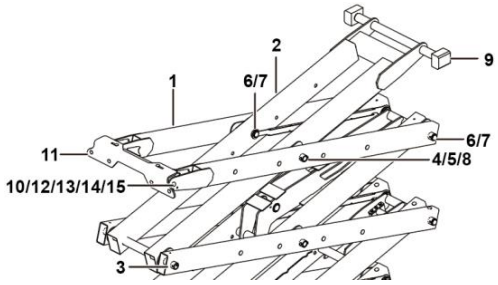


Fig. 3.24 Fifth fork assembly (SR4069E)

1. Fifth outer arm weldment 2. Fifth inner arm assembly 3. Shaft 4. Nut 5. Bolt 6. Retaining ring 7. Washer 8. Shaft 9. Slider 10. Shaft 11. Upper mount assembly 12. Safety pin 13. Bolt 14. Nut 15. Washer

a. Connect the part 1 to the fourth inner arm

with part 3, fix the part 3 on the fork with parts 4/5, and clamp the part 3 on the other side of the fork with parts 6/7;

b. Connect the part 2 to the fourth outer arm with part 3, fix the part 3 on the fork with parts 4/5, and clamp the part 3 on the other side of the fork with parts 6/7;

c. Fix part 1 and part 2 together with part 8, fix the end of part 8 on the outer side of the fork with parts 4/5, and clamp the inner side of the fork with parts 6/7;

d. Assemble the part 9 at both ends where the fifth inner arm is fixed;

e. Assemble part 11 to the double lug of fifth outer arm with part 10, fix part 10 with parts 12/13/14/15, and tighten it to the specified torque;

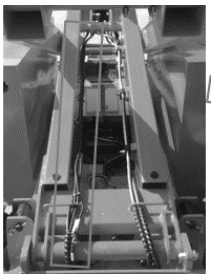
Tightening torque of part 5: 52±5N•m; tightening torque of part 13: 90±9N•m;

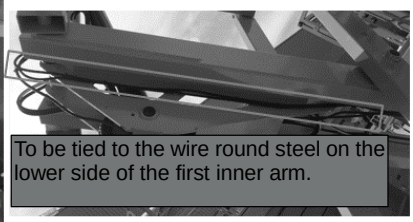
Tools: copper rod, ratchet wrench, socket wrench, open-end wrench

15. Assembling the wiring board of fifth fork (SR4069E)

a. The assembly method of the wiring board of fifth fork is the same as that of the wiring board of fourth fork.

16. Routing and tying the harness (SR4069E)





Lower cylinder harness

Upper cylinder harness

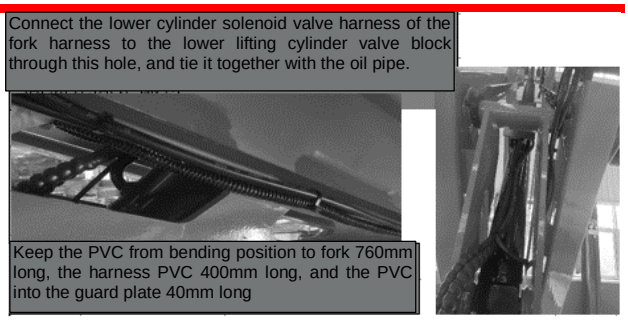


Fig. 3.25 Routing and tying the harness (SR4069E)

a. Keep the harness and oil pipe at the fork in the same direction, with the oil pipe on the left side of fork and the harness on the right side of fork. See the figure for the specific routing direction. After the harness is routed to the fifth fork and through the wiring board, throw it directly out from the upper part of the intermediate shaft of the fork, and keep the reserved harness about 50mm away from the fork surface.

b. Fix the harness into all the fixing holes on the wiring board with ties, keep the ties on the routing round steel spaced by 300mm, and ensure that the harness does not sag at any position.

c. Secure the two oil pipes of the upper and lower lift cylinders with ties every 300mm from the position 100mm away from the oil pipe joint to the position where the oil pipe is bent.

d. Tie the pressure sensor harness of the valve block on the lift cylinder to the oil pipe of the cylinder, and ensure that pressure sensor connector is not stressed, stretched or kinked.

e. At each curve, keep the outermost side of the curve about 50mm away from the round steel and the pin, and use PVC tape to protect the oil pipe, in which case wrapping of single harness is not required.

CAUTION: If the platform power harness

needs to be assembled, keep its direction consistent with the PCU harness.

17. Assembling the slider

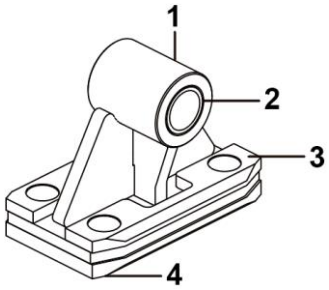


Fig. 3.26 Slider assembly

1. Support 2. Shaft sleeve 3. Slider 4. Slider

a. Install part 2 into the shaft hole of part 1;

b. Snap parts 3/4 onto part 1 respectively;

CAUTION: Keep the part 3 on the upper part and the part 4 on the lower part.

c. Install the slider assembly into the chassis slideway.

18. Lifting the fork

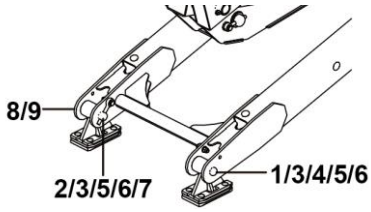


Fig. 3.27 Lifting the fork

1. Fixing plate pin 2. Shaft 3. Safety pin 4. Bolt 5. Nut 6. Washer 7. Bolt 8. Washer 9. Retaining ring

a. Lift the subassembled fork to the position above the chassis, adjust the position of the fork, and install the part 1 on the front side of the machine, and after the installation is completed, lower the traveling crane, align the rear side of the fork with the shaft hole of the slider, and insert the part 2.

b. Fix the part 1 with parts 3/4/5/6/8/9 after installation, and fix the part 2 with parts 3/5/6/7 after installation.

Reference tightening torque of parts 4 and 7: 90±9N•m;

Tools: copper rod, ratchet wrench, socket wrench, open-end wrench.

3.4.4 Replacing the fork slider at platform

1. Attach the sling to the lower part of the platform at the steering end and non-steering end of the machine, and pay attention not to attaching the sling to the railing of the platform.
2. Lift the platform slightly with lifting equipment until the stress on the slider is just relieved.
3. Slide out the fork assembly from the platform until two fork sliders are accessible.

⚠ WARNING: Risk of crushing.

If not properly supported with lifting equipment during removal of platform slider pivot, the platform may fall.

4. Remove the two old sliders and replace them with new ones.
5. Install the slider assembly into the platform slideway.

3.4.5 Replacing the fork slider at chassis

1. Support and attach the access ladder to an appropriate lifting equipment, remove the fasteners from the access ladder, and then remove the access ladder from the machine;
2. Use sling or other suitable means to fix the two ends of the fork to the two ends of the machine.
3. Attach the sling of the lifting equipment to the end of the scissor arm for removal of slider.
4. Lift the scissor arm slightly with lifting equipment until the stress on the slider is just relieved.
5. Remove the fastener from the slider pivot and set it aside.

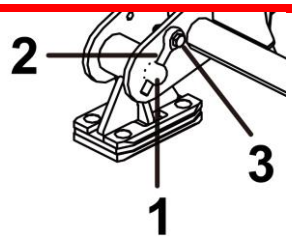


Fig. 3.28 Installation position of fork slider at chassis

1. Shaft 2. Safety pin 3. Bolt

6. Remove the slider pivot and set it aside. Slide the slider out of the slideway, and remove it from the machine.
7. Remove the fasteners that fix the wear pad from the slider assembly, and remove the wear pad.
8. Install a new wear pad on the slider.
9. Install the slider assembly into the chassis slideway.
10. Align the holes on the slider assembly with the holes on the scissor arm.
11. Install the slider pivot and its fasteners.
12. Lower the platform to the stowed position.

3.5 Removing and installing wheels

3.5.1 Removing wheels

1. Block the wheels from front and rear to ensure that the wheels will not rotate or move
2. Unscrew the wheel nuts, but do not remove them.
3. Place a jack with sufficient bearing capacity under the steering axle.
4. Raise the machine by 15 cm, and place a cushion block under the chassis for the purpose of supporting.

CAUTION: Risk of crushing.

If improperly supported, the machine may fall.

5. Unscrew the wheel nuts and remove the wheel.

3.5.2 Assembling wheels

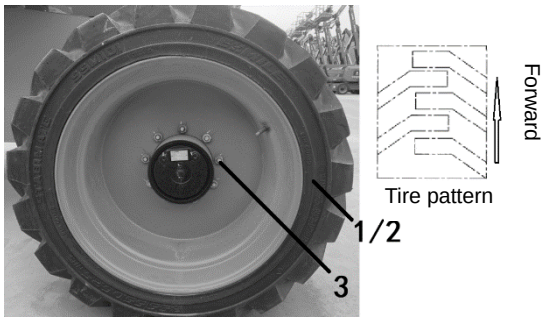


Fig. 3.30 Rear wheel assembly

1. Tire assembly (left) 2. Tire assembly (right) 3. Hexagon cone nut

1. Install parts 1 and 2 to the left and right sides of the rear axle respectively, and fasten them with parts 3;

NOTE: Before assembling, apply AT262 thread locker to the bolts

Reference tightening torque of part 3: 305±25N•m;

Tools: pneumatic wrench MI-18, torque wrench QSP420N, socket wrench 3/4-24mm, socket wrench 1/2 -24mm

3.6 Front axle assembly

3.6.1 Installing the steering rod and steering cylinder

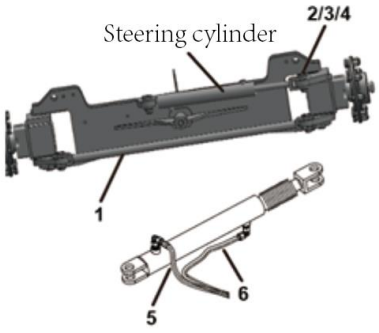


Fig. 0.31 Installing the steering rod and steering cylinder

1. Steering rod 2. Tie rod pin 3. Cotter pin 4. Washer 5. Hose 6. Hose

1. Use parts 2, 3 and part 4 to assemble part 1 and steering cylinder to the position of front axle weldment and steering knuckle as shown

in the Fig..

2. One end of the pin with a hole is located below, and part 4 should be placed between part 3 and the steering rod or steering cylinder; the cotter pin needs to be bent not less than 180° to both sides after installation.
3. Connect part 5 to the right-angle joint above the large cavity on the left side of the steering cylinder, and tighten it to the specified torque;
4. Connect part 6 to the right-angle joint under the small cavity on the right side of the steering cylinder, and tighten it to the specified torque; the unconnected end of part 5 is marked S1, and the unconnected end of part 6 is marked S2.

Tightening torque of parts 5/6: 22±2N•m;

Tools: needle-nosed pliers, torque wrench SP67*17

3.6.2 Removing the steering linkage and steering cylinder

Caution：

The O-ring (if any) of the removed fitting and hose assembly must be replaced. During installation, all connections must be tightened to specified torque. Please refer to the specification for selection of tightening torque of the lifting platform.

1. Block the non-steering tires to prevent them from moving.
2. Mark, disconnect and plug the hydraulic hose of the steering cylinder. and cover the fittings on the cylinder.
3. Remove the fasteners that fix the cylinder rod end pin. Remove the pin.
4. Remove the fasteners that fix the cylinder tube end pin. Remove the pin.

Caution：

When removing the fasteners, be sure to record the number and location of the removed washers.

5. Remove the steering cylinder from the machine.
6. Remove the fasteners that fix the pins on both ends of the steering linkage. Remove the pin.
7. Remove the steering linkage from the machine.

Danger：

Splashed hydraulic oil may penetrate and burn the skin. Therefore, please loosen hydraulic connectors very slowly to reduce the oil pressure gradually. Avoid hydraulic oil from splashing.

Caution：Risk of part damage.

If being kinked or squeezed, the hoses may be damaged.

3.6.3 Assembling the steering knuckle

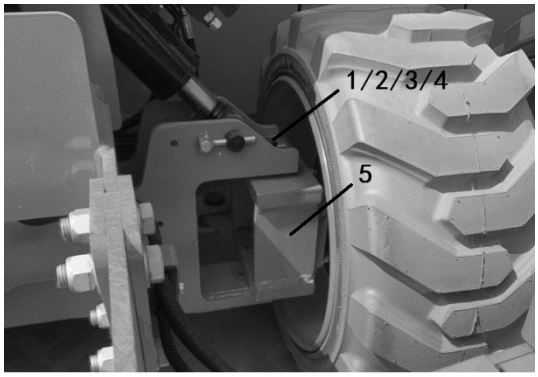


Fig. 3.32 Front axle assembly

1. Pin 2. Safety pin 3. Bolt 4. Washer 5. Steering knuckle

1. Assemble the shaft sleeve to the mounting hole on the front axle, assemble the left and right steering knuckles to the front axle with part 1, and fix them with parts 2/3/4;

3.6.4 Removing the steering knuckle

1. Lock the steering wheels and place the jack in the middle of the steering end of the chassis (i.e., the front axle).
2. Unscrew the wheel nuts, but do not remove

them.

3. Raise the machine by 5 cm. Place the bracket under the chassis for support.

CAUTION: Risk of crushing.

If not supported, the chassis may fall.

4. Remove the wheel nuts to remove the tires.

WARNING: Risk of personal injury.

Splashed hydraulic oil may penetrate and burn the skin. Therefore, please loosen hydraulic connectors very slowly to reduce the oil pressure gradually. Prevent the oil from spraying or splashing.

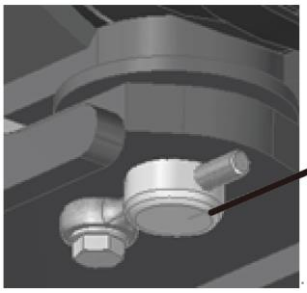
5. Use a jack to support and fix the steering knuckle.
6. Remove the steering linkage split pin.
7. Remove the fasteners on the pull rod pin from the steering cylinder, and then remove the pin;
8. 

Fig. 3.33 Lower pin

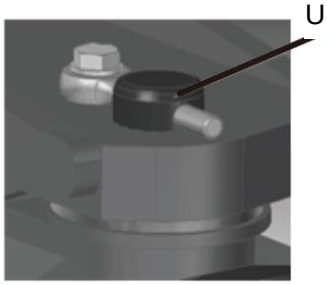


Fig. 3.34 Upper pin

9. Remove the fasteners of the upper and lower king pins of the steering knuckle, and then remove the upper and lower king pins.
10. Remove the steering knuckle.

CAUTION: Risk of crushing.

If not supported during removal, the steering knuckle may be out of unbalance or fall off.

3.6.5 Assembling the axle swing cylinder

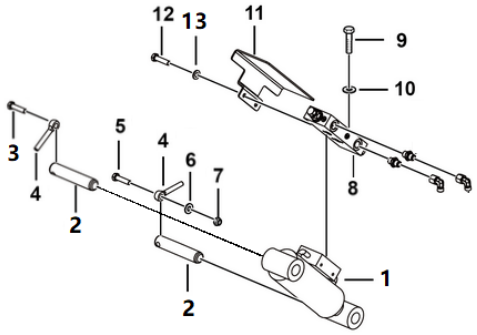


Fig. 3.35 Swing cylinder assembly

1. Floating cylinder 2. Shaft 3. Bolt 4. Safety pin 5. Bolt 6. Washer 7. Nut 8. Floating balance valve 9. Bolt 10. M8 hard gasket 11. Floating valve mounting plate 12. Bolt 13. Washer

1. Assemble part 1 to the left and right sides of the front axle with part 2; fix the part 2 on the upper end of the cylinder with parts 3/4 (on the front side of the machine), and the part 2 on the lower end with parts 4/5/6/7;
2. Remove the self-contained protective plate on the floating cylinder, clean the paint slag on the mounting surface of valve block, assemble part 8 onto part 1 with parts 9/10;

CAUTION: Keep the oil pipe interfaces on both sides of the valve body backward.

3. Assemble part 11 on part 1 with parts 12/13.

Reference tightening torque of parts 3 and 5: 52±5N•m;

Reference tightening torque of part 9: 33±3N•m;

Reference tightening torque of part 12: 28±3N•m;

Tools: ratchet torque wrench, electric wrench, socket

3.6.6 Removing the axle swing cylinder

CAUTION:

The O-ring (if any) of the removed fitting and hose assembly must be replaced. During installation, all connections must be tightened to specified torque. Please refer to the specification for selection of tightening torque of the lifting platform.

1. Mark, disconnect and block the hydraulic hose, and cover the fittings;
2. Attach the floating cylinder to the lifting equipment;
3. Remove the fasteners that fix the shafts at the upper and lower ends of the floating cylinder, and remove the shaft;
4. Remove the floating cylinder from the machine.
5. Remove the fasteners that fix the floating valve mounting plate, and remove the floating valve mounting plate;
6. Remove the fasteners that fix the floating valve, and remove the floating valve;

3.7 Rear axle assembly

3.7.1 Assembling the reducer

1. Assemble the reducer to the left and right mounting plates of the rear axle with screws and washers, and tighten it to the specified torque.

CAUTION:

Before assembling the reducer, it is necessary to assemble O-ring at the brake fluid port without squeezing the O-ring,; apply AT262 thread locker before installing the screw;

Note that the following requirements shall be met for the assembly of the reducer:

a. **The reducer shall be installed to the left rear axle housing in such a way that the threaded hole of the driving motor shown in the figure above is approximately 45° diagonally upward and the service brake fluid port is approximately 45° diagonally downward;**

b. **The reducer shall be installed to the right rear axle housing in such a way that the threaded hole of the driving motor shown in the figure above is approximately 45° diagonally downward and the service brake fluid port shown in Figure B is approximately 45° diagonally upward;**

Reference tightening torque of screw: 280±28N•m;

3.7.2 Assembling the rear axle driving motor

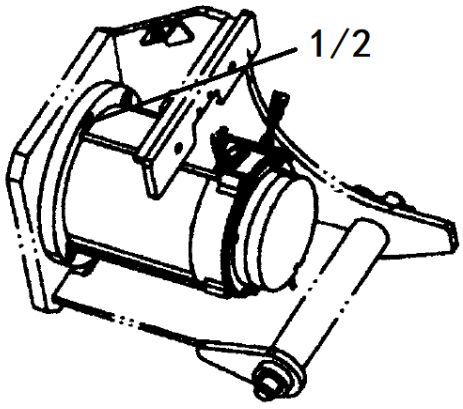


Fig. 3.36 Driving motor

1. Screw 2. Washer

1. Assemble the driving motor to the rear axle mounting plate with part 1 (coated with AT262 thread locking adhesive) / part 2. Before assembling, assemble the O-ring to the joint surface;

CAUTION:

1. Do not damage the O-ring;

2. Thread the bolt from inside out to prevent interference between the steel pipe

and the bolt!

Reference tightening torque of bolt: 100±10N•m

3.7.3 Removing the rear axle assembly

CAUTION: Risk of component damage.

The working area and surface where this step is performed must be clean, and no impurities will enter the hydraulic system, which may cause serious component damage. It is recommended that the dealer perform maintenance.

CAUTION:

Before refitting, the O-ring of the removed fitting and/or hose assembly must be replaced and then tightened to the specified torque. Please refer to hydraulic hose and joint torque specifications.

1. Lock the non-steering wheels and place the jack in the middle of the steering end of the chassis.
2. Unscrew the wheel nuts, and do not remove them.
3. Raise the machine by 5 cm. Place the bracket under the chassis for support.
4. Remove the wheel nuts to remove the tires.
5. Disconnect the driving motor harness.

WARNING: Risk of personal injury.

Splashed hydraulic oil may penetrate and burn the skin. Therefore, please loosen hydraulic connectors very slowly to reduce the oil pressure gradually. Prevent the oil from spraying or splashing.

6. Remove the driving motor fasteners.
7. Pull out the driving motor shaft from the reducer, and remove the driving motor from the machine.

CAUTION:

An O-ring is installed between the driving motor and the reducer. When installing the driving motor to the machine, make sure that the O-ring is in the correct position.

8. Place another jack under the reducer to support and fix the reducer.
9. Remove the fasteners of the reducer and then remove the reducer.

3.8 Outrigger assembly

3.8.1 Assembling the outrigger cylinder

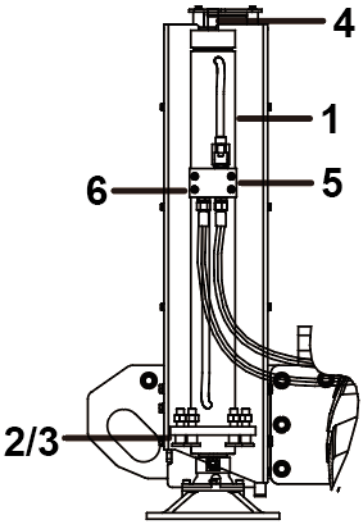


Fig. 3.37 Outrigger cylinder

1. Outrigger cylinder 2. Bolt 3. Screw 4. Cylinder guide stud
5. Outrigger cylinder solenoid valve 6. Screw

1. Assemble part 1 to the mounting places on both sides of the support beam with part 2 (coated with AT262 thread locking adhesive) / part 3;
2. Install part 4 to the mounting hole on the upper part of the outrigger cylinder;
3. Remove the protective plate which is provided at the mounting position of the cylinder valve block, clean up the paint slag on the mounting surface of the valve block, etc., use part 6 to install part 5 to the outrigger cylinder.

CAUTION: The Fig. 3.36 only shows the installation of one cylinder, and can be referenced for installation of other cylinders;

Reference tightening torque of part 2: 125±13N•m;

Reference tightening torque of part 6: 33±3N•m;

Reference tightening torque of part 4: 145±15N•m;

Tools: ratchet torque wrench QSP50N3, 3/8" S6 hex bit socket, 1/2" hexagon head socket wrench 12, torque wrench QSP200, open-end wrench 18-21

3.8.2 Removing the outrigger cylinder

CAUTION:

Before refitting, the O-ring of the removed fitting and/or hose assembly must be replaced and then tightened to the specified torque. Please refer to hydraulic hose and joint torque specifications.

CAUTION:

This procedure should be implemented when the platform is stowed and the outrigger are retracted.

1. Remove the outrigger cylinder support.
2. Remove the fasteners that fix the outrigger cover, and then remove the outrigger cover.
3. Mark and disconnect the wire harness of the outrigger cylinder solenoid valve.
4. Mark, disconnect and plug the hydraulic hose of the outrigger cylinder. Cover the fittings on the cylinder.

WARNING: Risk of personal injury.

Splashed hydraulic oil may penetrate and burn the skin. Therefore, please loosen hydraulic connectors very slowly to reduce the oil pressure gradually. Prevent the oil from spraying or splashing.

5. Attach the sling of the lifting equipment to the outrigger cylinder tube end, without applying pressure.
6. Undo the retaining fasteners from the outrigger cylinder, and remove the outrigger cylinder from the machine.

WARNING: Risk of crushing.

If not properly supported during removal, the outrigger cylinder may be out of balance or fall off.

CAUTION:

When replacing the outrigger cylinder, remove the outrigger cylinder guide stud from the outrigger cylinder tube end and install it on the new cylinder.

3.8.3 Assembling the level meter

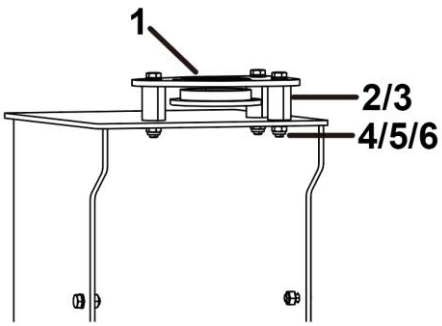


Fig. 3.38 Level meter assembly

1. Level meter 2. Mounting plate weldment 3. Cushion block 4. Bolt 5. Nut 6.Washer

1. Assemble part 2 to be above the right front outrigger weldment with parts 3/4/5/6;
2. Assemble the level meter to the mounting plate with the screws and nuts provided with the level meter (for subsequent adjustment and leveling); tighten the part 4 until the cushion block is slightly deformed, and the screws and nuts provided with the level meter should not interfere with the outrigger

weldment! The scale level meter is provided at the front, rear, left, and right sides.

Tools: ratchet torque wrench QSP50N3, 3/8" S6 hex bit socket, 3/8" S6 hex bit socket, hexagon head socket wrench 1/2-8mm, ratchet torque wrench QSP100N, open-end wrench 13-16

Note: For simple component, the removal is to be carried out in reverse order of assembly, and will not be described in detail here.

3.8.4Assembling the outrigger weldment

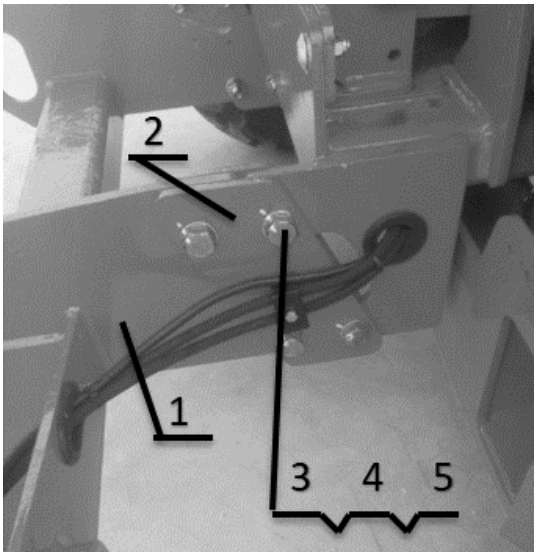


Fig. 3.39 Outrigger weldment assembly

1. Front outrigger weldment 2. Connecting plate 3. Bolt 4. Washer 5. Nut

1. Hoist part 1 to the front axle mounting position on the chassis, and then fix it with parts 2/3 (from outside to inside)/4/5.
2. The assembling method of the rear outrigger weldment is the same as that of the front outrigger weldment.

Reference tightening torque of part 3: 595±60N•m;

Tools: pneumatic wrench MI-20P, QLE750N, self-made long handle socket wrench 30, socket wrench 3/4-30.

3.8.5 Assembling the outrigger cylinder

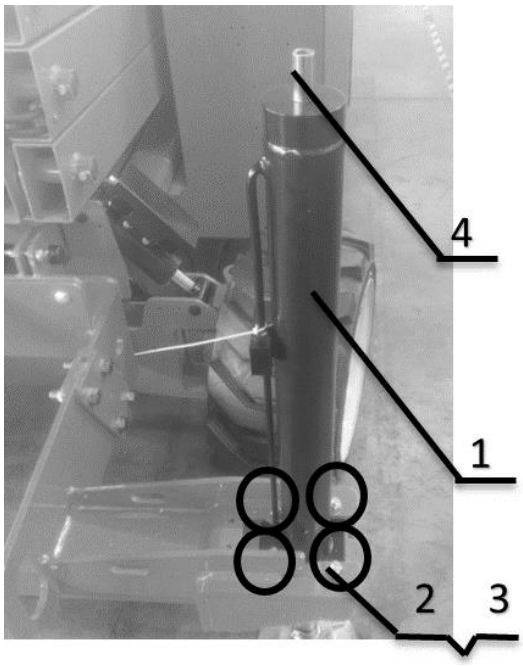


Fig. 3.40 Outrigger cylinder assembly

1. Outrigger cylinder 2. Outrigger cylinder mounting bolt 3. Nut 4. Outrigger cylinder guide stud

1. Assemble part 1 to the mounting places on both sides of the support beam with part 2 (coated with AT262 thread locking adhesive) / part 3;
2. Install part 4 to the mounting hole on the upper part of the outrigger cylinder;

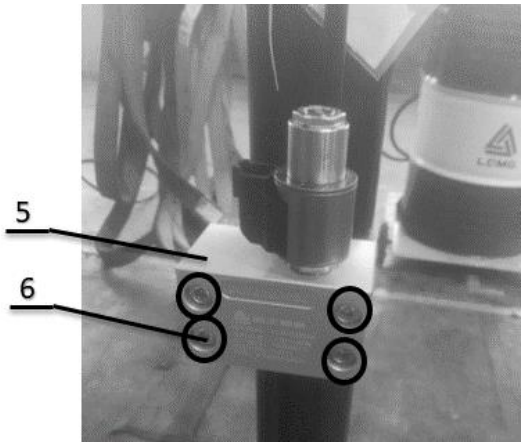


Fig. 3.41 Outrigger cylinder solenoid valve assembly

5. Outrigger cylinder solenoid valve 6. Screw

3. Remove the protective plate which is provided at the mounting position of the

cylinder valve block, clean up the paint slag on the mounting surface of the valve block, etc., use part 6 to install part 5 to the outrigger cylinder.

Reference tightening torque of part 2: 125±13N•m;

Reference tightening torque of part 6: 33±3N•m;

Reference tightening torque of part 4: 125±13N•m;

Tools: ratchet torque wrench QSP50N3, 3/8" S6 hex bit socket, 1/2" hexagon head socket wrench 12, torque wrench QSP200, open-end wrench 18-21

CAUTION: The following figure only shows the installation of one cylinder, and can be referenced for installation of other cylinders.

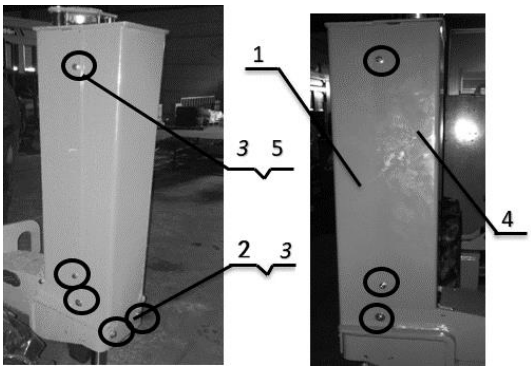


Fig. 3.42 Outrigger cover weldment assembly

1. Cover weldment 2. Bolt 3. Washer 4. Guard plate 5. Bolt Assemble part 1 to the two ends of the front and rear outriggers respectively with parts 2/3;

4. Install part 4 to each of the four outrigger cover weldments with parts 3/5.

Reference tightening torque of parts 2 and 5: 28±3N•m

Tools: electric impact wrench 51081, socket wrench 3/8 13mm

3.9 Other components

3.9.1 Assembling the double-pole main power isolation switch

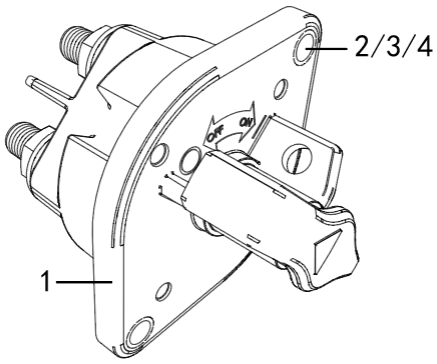


Fig. 3.43 DC power switch assembly

1. Double-pole main power isolation switch 2. Bolt 3. Washer 4. Nut

1. Install part 1 to the battery side and fix it with parts 2/3/4. Note that when installing part 1, the switch marking (OFF/ON) shall be located on the upper side.
2. Connect the power cable to part 1 using the nut provided together with the part 1.

3.9.2 Assembling battery

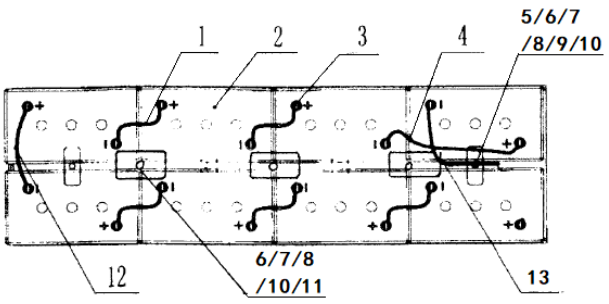


Fig. 3.44 Battery assembly

1. Battery series connection cable 2. Battery 3. Nut 4. Power cable 5. Long screw 6. Pressure plate 7. Nut 8. Washer 9. Double-pipe clamp 10. Rubber plate 11. Short screw 12. Power cable 13. Power cable

1. Fix part 2 to the battery box with parts 5/6/7/8/9/10/11.
2. Connect the batteries in series with part 1 as shown.

NOTE: The positive terminal of the battery is

on the outside;

Reference tightening torque of part 5: 12±1N•m;

3.9.3 Assembling the DC contactor and converter

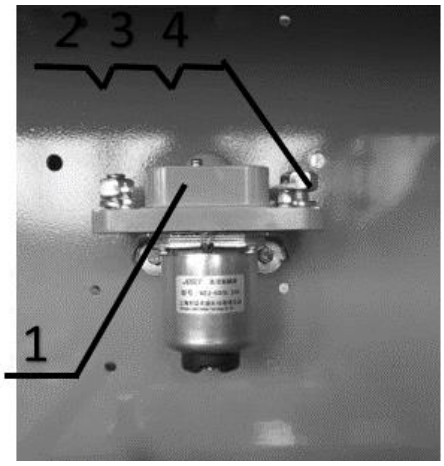


Fig. 3.45 DC contactor assembly

1. DC contactor 2. Bolt 3. Washer 4. Nut

1. Assemble part 1 to the right box with parts 2/3/4.

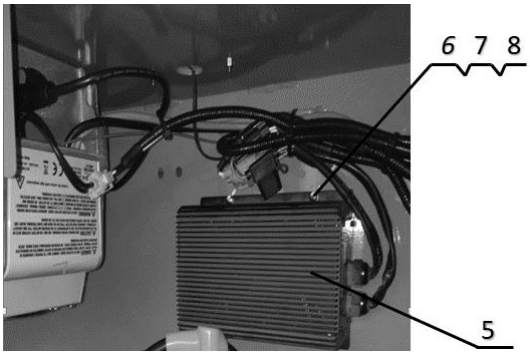


Fig. 3.46 Converter assembly

2. Assemble part 5 to the right side of the right box with parts 6/7/8, and insert the screws from top to bottom.

Reference tightening torque of part 2: 12±1N•m;

Reference tightening torque of part 6: 6±1N•m

Tools: electric impact wrench DRIVER M12BD; socket wrench 3/8-10mm; open-end ratchet wrench 10-10; Phillips screwdriver; open-end ratchet wrench 8-8; adapter 1/4-3/8.

3.9.4 Assembling the charger and work indicator

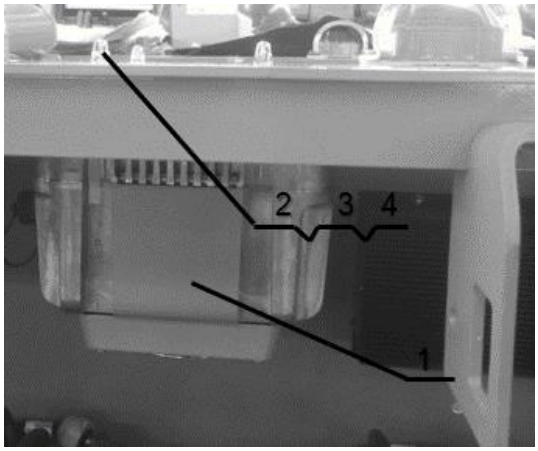


Fig. 3.47 Charger assembly

1. Charger 2. Washer 3. Screw 4. Cap nut

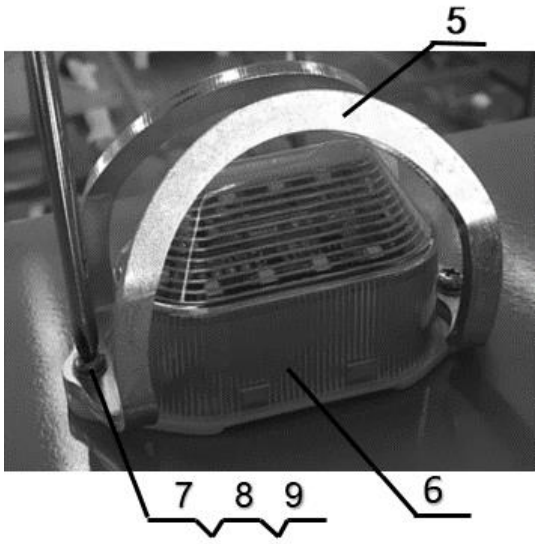


Fig. 3.48 Work indicator assembly

5. Cover 6. Work indicator 7. Screw 8. Washer 9. Nut

1. Assemble part 1 to the position of right box as shown with parts 2/3/4, and install part 2 to the nut side.
2. Assemble parts 5/6 to the position above the box as shown with parts 7/8/9, with shims installed on both sides.

Reference tightening torque of part 3: 12±1N•m;

Tools: electric impact wrench DRIVER M12BD; Allen wrench 5; socket wrench 3/8-10mm; adapter 1/4-3/8; open-end ratchet wrench 7-7;

Phillips screwdriver.

3.10 Assembling the hydraulic oil tank

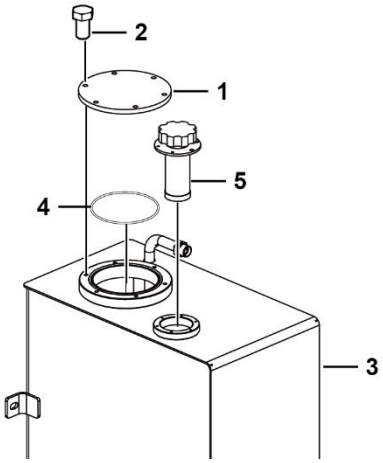


Fig. 3.49 Hydraulic oil tank assembly

1. Flange 2. Bolt 3. Tank body weldment 4.O-ring 5. Air cleaner

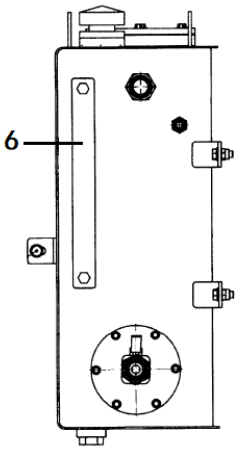


Fig. 3.50 Level gauge assembly

6. Level gauge

1. Remove the bolts of the tank, install the part 4 into the part 1, ensure that the part 1 is flat, and then install the assembled part 1 to part 3 with part 2.
2. Install part 6 to the hydraulic oil tank with the bolts provided with the level gauge.
3. Install the part 5 on the part 3, but do not tighten it until the oil refilling is completed.

Reference tightening torque of part 4: 28±3N•m;

Tightening torque of bolt provided together with the level gauge: 23±2N•m;

Tools: electric impact wrench DRIVER M12BD; socket wrench 3/8-10mm; adapter 1/4-3/8; ratchet torque wrench QSP50N3; socket wrench 3/8 16mm.

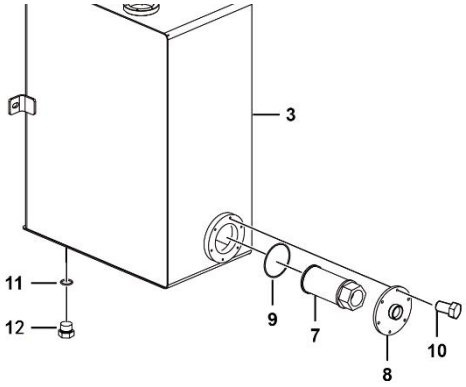


Fig. 3.51 Hydraulic oil tank assembly

7. Suction filter 8. Suction flange assembly 9. O-ring 10. Bolt 11.O-ring 12. Screw plug

4. Install parts 7/9 on the part 8 with the part 9 closely fitting the part 8 without wrinkling, and then install the assembled part 8 under the hydraulic oil tank with part 10.
5. Assemble parts 11/12 to the oil drain below part 3.

CAUTION: Do not wear white thread gloves when assembling hydraulic parts, so as to ensure the absolute cleanliness of hydraulic parts!

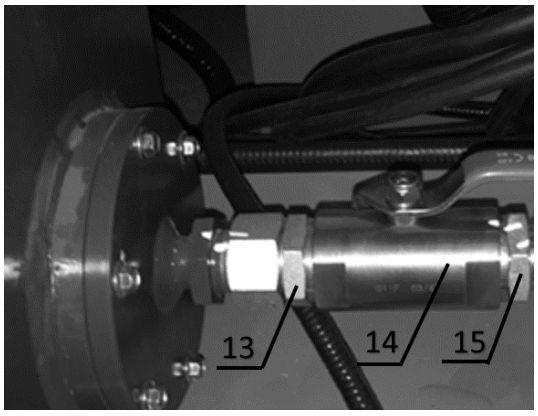


Fig. 3.52 Ball valve assembly

13. Straight-through combination fitting 14. Ball valve 15. Straight fitting

6. Assemble part 13 to the suction flange of the hydraulic oil tank;

7. Assemble part 14 to part 13;
8. Assemble part 15 to part 14.

CAUTION: Make sure that the handle is above part 14 during installation! Fix the handle of the ball valve when it is opened and needs not to be closed, so as to prevent misoperation.

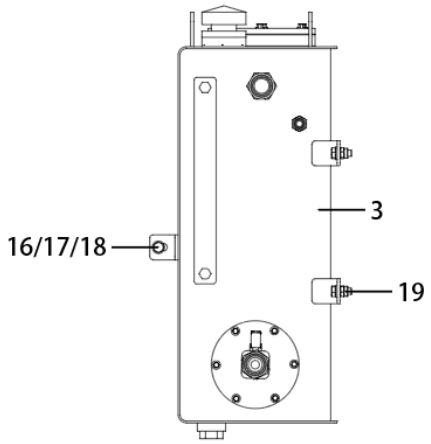


Fig. 3.53 Hydraulic oil tank assembly
16. Bolt 17. Washer 18. Nut 19. Bolt

9. Install the hydraulic oil tank to the inner side of the tank, and then assemble part 3 to the left tank with parts 16/17/18/19.

3.11 Valve group

3.11.1 Installing the spool

1. Immerse the spool in clean oil to lubricate the O-ring.
2. Manually screw in the spool until it reaches the top of the O-ring, and then adjust the torque to meet specification requirements.
3. If necessary, install the solenoid coil on the valve stem. Fix the coil to the valve stem with nuts and adjust the torque to meet the specification requirements.

3.11.2 Scissor fork platform control valve

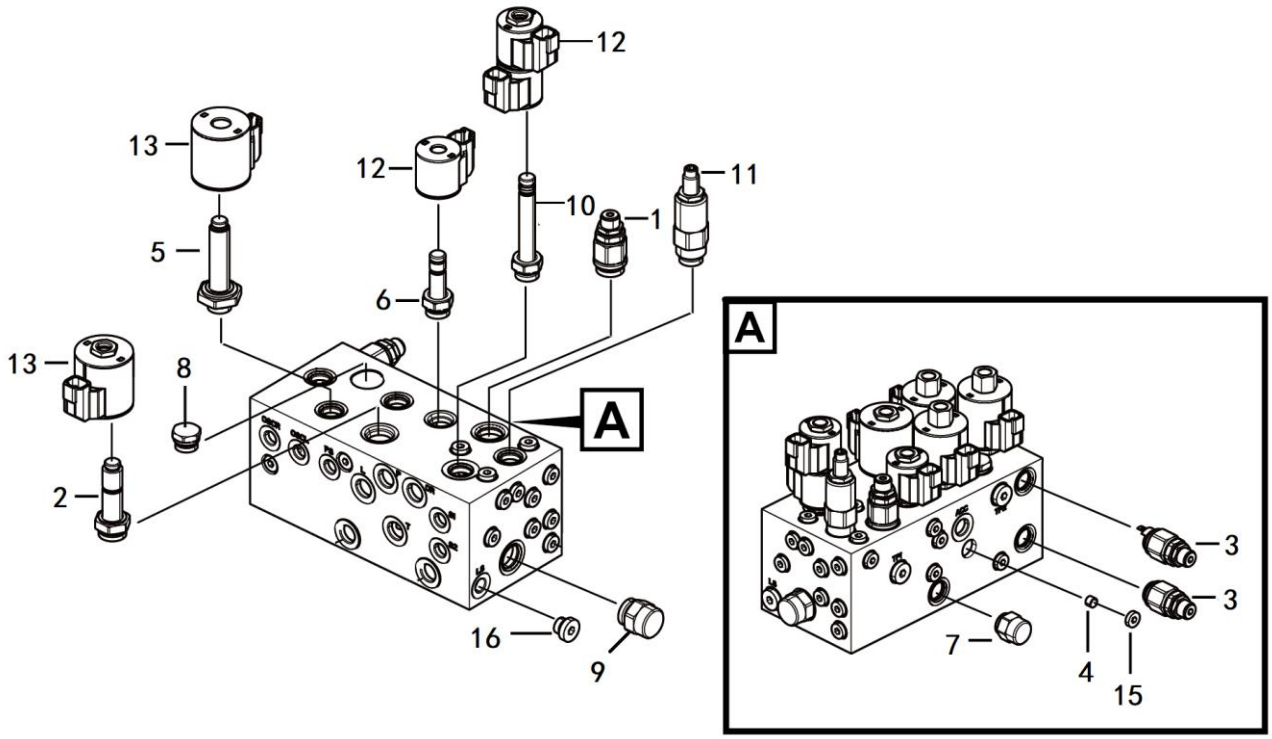


Fig. 3.54 Scissor fork platform control valve

S/N	Name	Function	Torque (N•m)
1	Relief valve	Restricting maximum pressure	55-65
2	On/off solenoid valve	Control actions	37-40
3	Relief valve	Restricting maximum pressure	40-45
4	M6 damper	-	5
5	On/off solenoid valve	Control actions	32-35
6	On/off solenoid valve	Control actions	43-47
7	Throttle valve	Controlling flow	43-47
8	Check valve	Limiting the direction	40-45
9	Flow valve	Controlling flow	55-60
10	On/off solenoid valve	Control actions	32-35
11	Two-way relief valve		43-47
12	Coil	-	4
13	Coil	-	4
15	Plug	-	11-12
16	Plug	Controlling the flow stability	25-28

3.11.3 Lower lift cylinder control valve ST4639-AB0E(SR3369E)

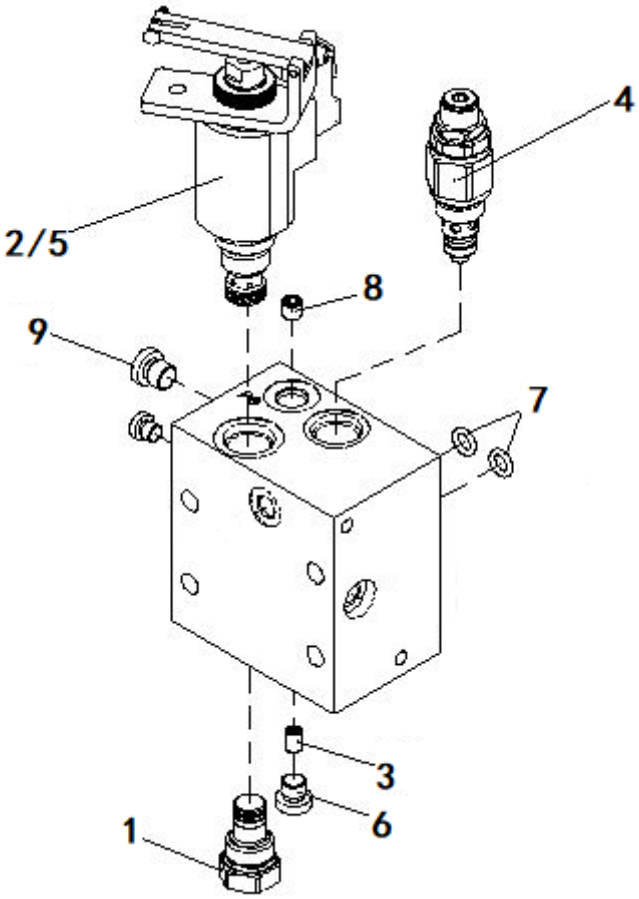
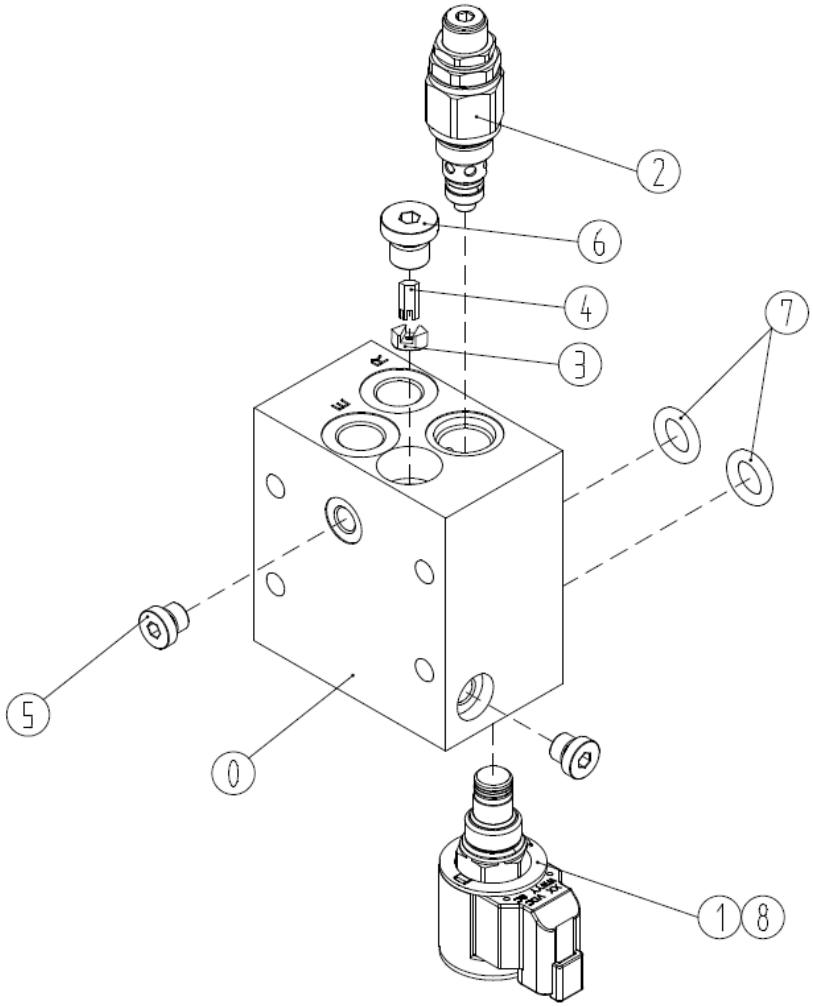


Fig. 3.55 Lower lift cylinder control valve

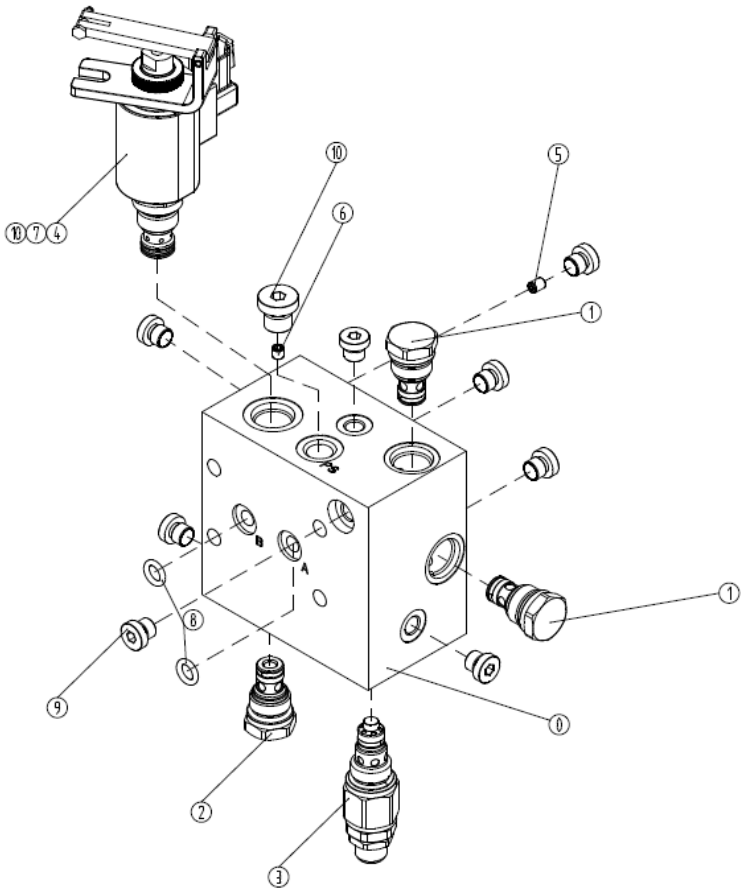
S/N	Name	Function	Torque (N•m)
1	Check valve	Enabling one-way flow of hydraulic oil	40-45
2	Proportional solenoid valve	Controlling hydraulic oil flow proportionally	34-41
3	Damper	-	4
4	Overflow valve assembly	Limiting the maximum pressure of the lifting system	40-45
5	Emergency mechanism	-	-
6	Plug	Controlling the flow stability	11-12
7	O-ring	-	-
8	Damper assembly	Control the lifting speed	4
9	Plug	-	25-28

3.11.4 Upper cylinder valve block ST5243-AC0A (SR4069E)



S/N	Name	Function
0	Valve block	-
1	Solenoid valve	Controlling the action of upper lift cylinder
2	Relief valve	Limiting the maximum pressure of upper lift cycling
3	Damper	-
4	Damper ejector rod	-
5	Plug	-
6	Plug	-
7	O-ring	-
8	Coil	-

3.11.5 Lower cylinder valve block ST5242-AC0C (SR4069E)



S/N	Name	Function	Torque (N•m)
0	Valve block	-	-
1	Check valve	Enabling one-way flow of hydraulic oil	40-45
2	Check valve	Enabling one-way flow of hydraulic oil	40-45
3	Relief valve	Limiting the maximum pressure of the lifting system	40-45
4	Proportional solenoid valve	Controlling hydraulic oil flow proportionally	34-41
5	Damper	Stabilizing hydraulic oil flow	2
6	Damper	Stabilizing hydraulic oil flow	2
7	Emergency mechanism	-	-
8	O-ring	-	-
9	Plug	-	11-12
10	Plug	-	25-28
11	Coil	-	4

Chapter Ⅳ Commissioning

4.1 Safety instructions

Before commissioning, please make sure to refer to the *Operation and Maintenance Manual*, familiarize yourself with the relevant safety precautions and basic operating requirements, and be particularly familiar with the following safety matters:

1. Alcoholics, drug users, and those taking inhibition reaction drugs are strictly prohibited to approach and operate the machine;
2. Before operating the machine, please ensure that you have worn protection equipment, such as helmet, safety belts (five-point), safety shoes, and you are in good physical condition;
3. The machine cannot be operated with the hood open. Before starting the engine, check the surrounding enviroN•ment of the machine to ensure that no person works on the engine to avoid any danger during engine start. These instructions will not be repeated below;
4. Before operating the machine, sound the horn and check that there are no people or obstacles around, so as to avoid safety hazards to others, yourself, the machine or obstacles. Other people are not allowed to operate the machine during commissioning;
5. This machine is not insulated, and does not provide protection against electric shock when it is in contact with or near wires, power supplies or electrical equipment.

Please follow the applicable laws and regulations and the instructions in the table below to maintain a sufficient safety distance from wires, power supplies, and electrical equipment.

Voltage	Required safety distance
0V～50KV	3.05m/10ft
50V～200KV	4.60 m/15ft
200V～350KV	6.10 m/20ft
350V～500KV	7.62m/25ft
500V～750KV	10.67m/35ft
750V～1000KV	13.72m/45ft

If the machine comes into contact with a live wire, stay away from the machine immediately. Before the power of the wire is cut off, personnel are forbidden to touch or operate the machine. Do not operate or use the machine during lightning or storms.

6. Do not raise the fork when the wind speed may exceed 12.5 m/s/28mph. If the wind speed exceeds 12.5m/s/28mph after the arm rod is raised, lower the fork and do not continue to operate the machine;
7. Do not operate the machine in strong winds or gusts. Do not increase the surface area of the platform or load. Enlarging the area exposed to the wind will reduce the stability of the machine;
8. Do not operate the machine via the PCU when the platform is tripped, stuck, or its normal movement is hindered by other objects nearby. If it is expected to operate the machine via the ground control unit, this operation can be done only after all personnel have left the platform;
9. Be extremely careful and reduce the speed when the machine runs in retracted state on gravel, unstable or smooth surfaces, near openings or steep slopes, etc.;
10. Do not sit, stand or climb on the protective guard of the platform. Stand steadily on the platform base plate at all times.

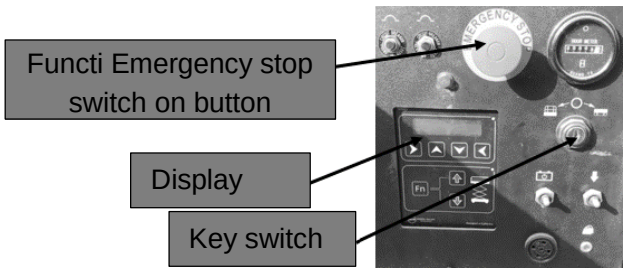
4.2 Test of basic functions

4.2.1 Pick-up inspection

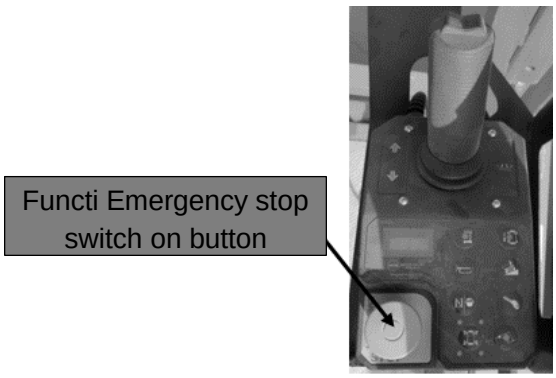
1. After receiving the machine, follow the machine checklist to check the machine to be tested in terms of: basic information, appearance of the machine, configuration of the machine, oil and water volume, electrical components, etc.; for specific inspection items, refer to “Receipt inspection” column of the machine checklist; any problem found should be recorded in time.
2. The following electrical components should be carefully checked: key switch, emergency stop button, GCU system button, PCU control button, foot switch.

Inspection criteria: effective in use;

4.2.2 Start/stop test



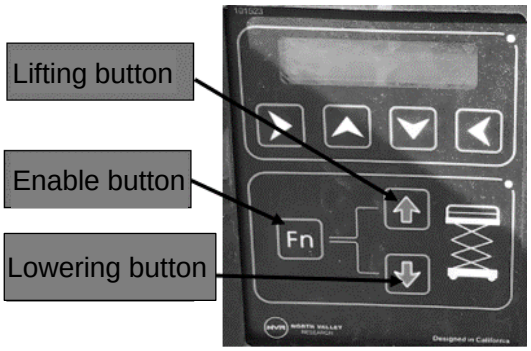
1. Ground control mode: Turn the key to GCU position, and pull up the emergency stop button. In this case, the GCU LCD screen will display “System Ready”;



2. Platform control mode: Turn the key to PCU position, and press the emergency stop buttons of PCU and GCU. In this case, the GCU LCD screen will display “System Ready”;

Control criteria: No DTC is activated for the GCU and PCU.

4.2.3 Lifting/lowering function test



1. Turn the key switch to the GCU position, and operate on the control panel. Press the platform up button only;

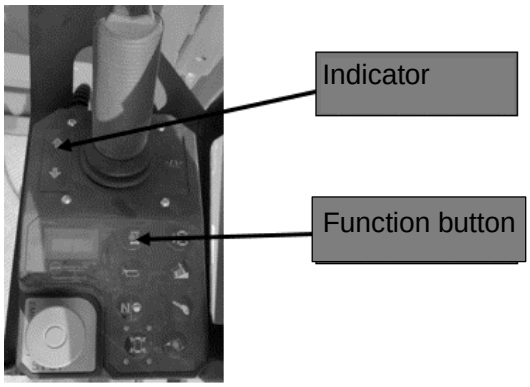
Control criteria: The platform isn’t lifted.

2. Press and hold the lift enable switch and the platform UP switch;

Control criteria: The platform is lifted.

3. Press and hold the lift enable switch and the platform DOWN switch;

Control criteria: The platform is lowered, and the lowering alarm sounds.



4. Select platform lifting function with the PCU. Turn on the lifting joystick switch as indicated by the blue arrow;

Control criteria: The platform isn’t lifted.

5. Press and hold the lift switch, and turn on the lifting joystick switch as indicated by the blue arrow;

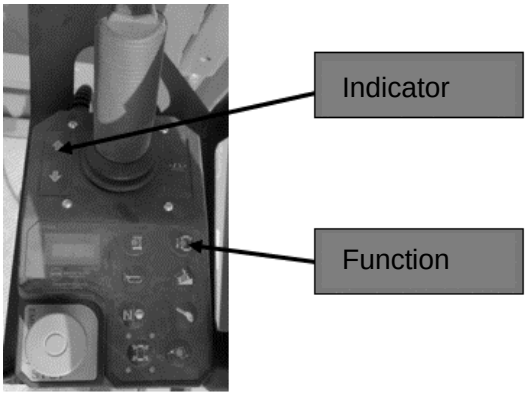
Control criteria: The platform is lifted.

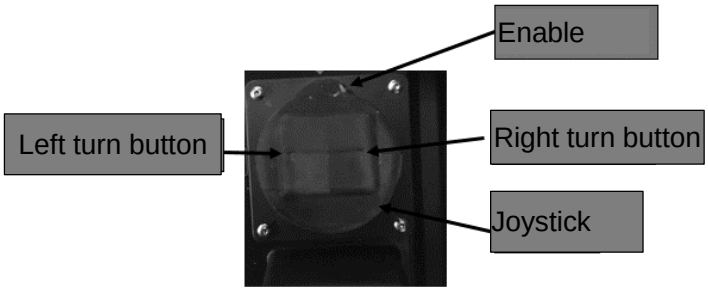
6. Press and hold the lift switch, and turn on the lowering joystick switch as indicated by the

yellow arrow;

Control criteria: The platform is lowered, and the lowering alarm sounds.

4.2.4 Steering test





1. Select the walking function, press and hold the joystick function enable button;
2. Operate the thumb joystick switch on the top of the joystick as indicated by the blue arrow on the control panel;

Control criteria: The turning wheel rotates as indicated by the blue arrow on the control panel.

3. Operate the thumb joystick switch on the top of the joystick as indicated by the yellow arrow on the control panel;

Control criteria: The turning wheel rotates as indicated by the yellow arrow on the control panel.

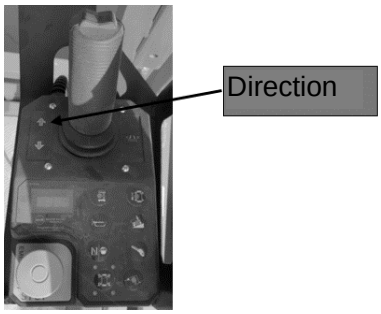
CAUTION: The tester shall stand in the middle of the platform and face toward the steering end of the machine under test.

4.2.5 Horn test

1. Turn on the power supply of the machine and switch to platform control model;
2. Press the horn button.

Control criteria: The horn sounds.

4.2.6 Drive and brake function test



1. Press and hold the joystick function enable switch;
2. As indicated by the blue arrow on the control panel, slowly move the joystick until the machine under test starts to travel, and return the joystick to the center;

Control criteria: The machine under test travels as indicated by the blue arrow and stops immediately.

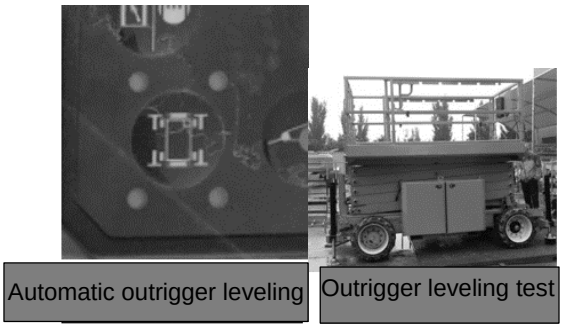
3. As indicated by the yellow arrow on the control panel, slowly move the joystick until the machine under test starts to travel, and return the joystick to the center;

Control criteria: The machine under test travels as indicated by the yellow arrow and stops immediately.

CAUTION: The machine under test shall be able to stop steadily on any slope during traveling.

4.3 No-load test

4.3.1 Outrigger leveling test

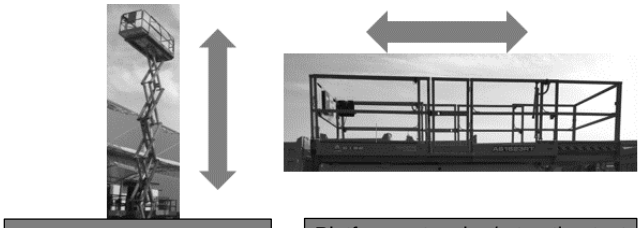


1. Automatic leveling: turn the key to the PCU position, stow the forks completely, press and hold the AUTO LEVEL button, and when the

outrigger travel switches are all triggered, the four indicator lights will be on, and then the platform will continue to level. After the automatic leveling is completed, the PCU joystick buzzer will stop for a while and then sound at an increasing sound length.

Control criteria: The outriggers can extend and retract smoothly, the fork can be lifted and lowered smoothly, and the platform can extend and retract smoothly without abnormal noise;

4.3.2 Fork and platform test



Fork lifting/lowering test | Platform extension/retraction test

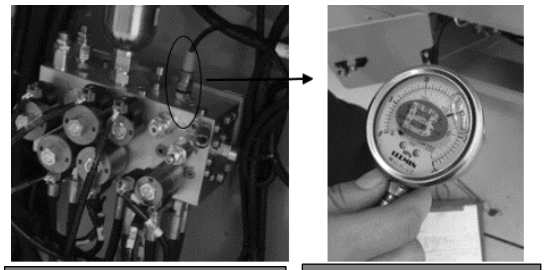
Fig. 4.6 Fork and platform

1. Test method: After extending and leveling the outriggers, lift and lower the fork properly for 5 times respectively, and conduct normal start and stop for 2~3 times in the process; extend the left and right platforms twice respectively, and conduct normal stop, fixation and start in the process;

Control criteria: The outriggers can extend and retract smoothly, the fork can be lifted and lowered smoothly, and the platform can extend and retract smoothly without abnormal noise.

4.4 Relief pressure test

4.4.1 Lift relief pressure test



Port L of lift control valve | Lift relief pressure measurement

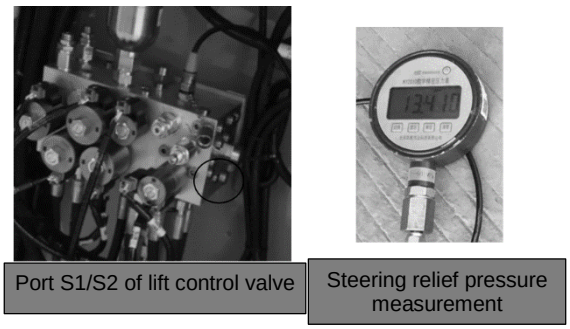
1. After measuring the system relief pressure, measure the lift relief pressure with the same pressure gauge;
2. Lift the machine to the limit height, observe the lift pressure until the pressure gauge indicates the maximum value, and maintain the pressure for 5 s. At this time, the indication of the gauge is the lift relief pressure. Record the pressure;

Target lift relief pressure: 19.7±0.5 (Mpa);

In case of inconsistency with the target value, do correction as follows:

3. Unscrew the fastening nut of the lift relief valve, and rotate the valve spool clockwise or counterclockwise with the Allen wrench to increase or decrease the pressure as appropriate until the pressure is consistent with the target value;
4. Keep the position of the Allen wrench unchanged, and tighten the fastening nut of the lift relief valve; restore the rocker arm to the normal position.
5. After the measurement, remove the tee and restore the pipe to its original state.

4.4.2 Steering relief pressure test



Port S1/S2 of lift control valve | Steering relief pressure measurement

1. Remove the plug at ports S1 and S2 of the lift control valve, install the pressure tap and connect it to the pressure gauge.
2. Turn the turning wheel to the left and right limit positions respectively, observe the steering pressure until the pressure gauge indicates the maximum value, and maintain the pressure for 5 s. At this time, the

indication of the gauge is the steering relief pressure. Record the pressure;

Target steering relief pressure: 10.3±0.5 (Mpa);

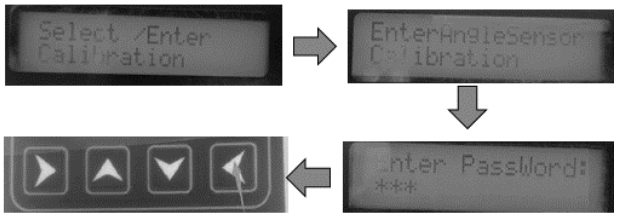
In case of inconsistency with the target value, do correction as follows:

3. Unscrew the fastening nut of the system relief valve, and rotate the valve spool clockwise or counterclockwise with the Allen wrench to increase or decrease the pressure as appropriate until the pressure is consistent with the target value;
4. Keep the position of the Allen wrench unchanged, and tighten the fastening nut of the steering relief valve;
5. After the measurement, remove the pressure tap and install the plug.

4.5 Calibration test

4.5.1 Inclination calibration

Platform parking



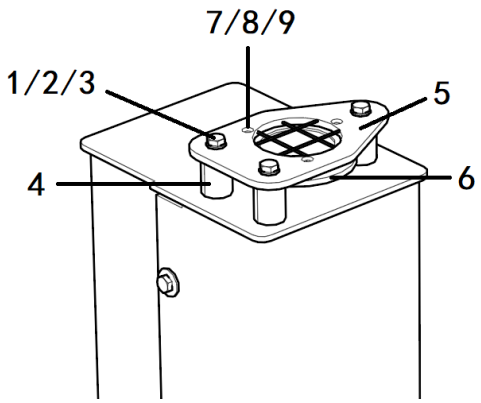
Adjustment

1. Drive the machine to an absolute level platform;
2. Adjusting method:

   a. Park the machine on the absolute level platform;

   b. Press and hold the [Confirm] and [Return] buttons at the same time to enter the menu as shown; press the Page-down button to select the interface as shown, press the [Confirm] button to enter the password input interface, enter the password by pressing the [Return] button four times, and then press the [Confirm] button to enter the calibration interface;
3. After the level calibration is started, the ECU will read the current data of level sensor as the reference data for calibration. If the data is stable and within the appropriate range, the buzzer will sound once to indicate that the calibration is completed. If the calibration cannot be completed, it is recommended to adjust the GCU mounting position for calibration again.

4.5.2 Adjustment of level meter



1. Bolt 2. Washer 3. Nut 4. Cushion block 5. Mounting plate weldment 6. Level meter 7. Screw 8. Washer 9. Nut

1. After the outrigger leveling, place the machine on the absolute level platform again.

Adjusting method:

2. Fix part 6 to part 5 with the self-contained screws;
3. Fix the assembled part 5 to the outrigger with parts 1/2/3/4, and adjust part 7 to center the bubble of level meter.

CAUTION: The screw provided together with the level meter shall not interfere with the outrigger weldment.

4. Adjust the three circled mounting points shown in the above figure with the Torx screwdriver and the open-end wrench to place the bubble of the level meter in the center, and then tighten the fixing nut.

Note: The tighter the nut, the higher the spring compression, and the closer the bubble will be to the screw.

4.6 Inclination test

4.6.1 3° forward/backward inclination test

Forward climbing

Reverse climbing

1. Drive the machine forwards and backwards to a 3° slope separately, ensuring the machine is completely on the slope;
2. Lift the fork, and test if the buzzer sounds. The inclination is satisfactory if the buzzer sounds; otherwise, the chassis inclination switch needs to be adjusted; refer to the calibration test (inclination calibration) for adjustment method.

CAUTION: After the adjustment of the inclination switch, both the fore-and-aft inclination and the left-and-right inclination need to be tested again.

4.6.2 2° leftward/rightward inclination test

One side-left

One side-right

3. Move the left and right wheels of the machine to the “single-sided bridge” separately, ensuring one wheel is completely on the “bridge” and the other on the level ground; the target value of leftward/rightward inclination is 2°;
4. Lift the fork, and test if the buzzer sounds. The inclination is satisfactory if the buzzer sounds; otherwise, the chassis inclination switch needs to be adjusted; refer to the calibration test (inclination calibration) for adjustment method.

CAUTION: After the adjustment of the inclination switch, both the fore-and-aft inclination and the left-and-right inclination need to be tested again.

4.7 Load calibration

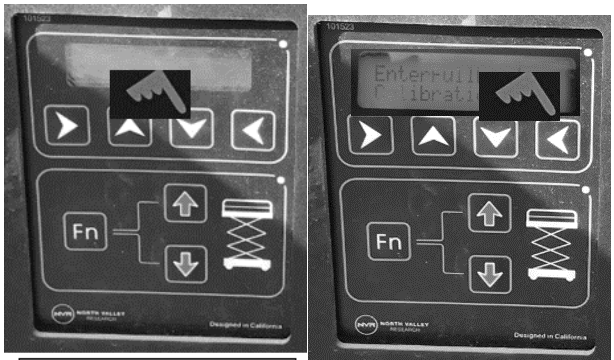
4.7.1 No-load calibration

Turn on the power supply of the machine

1. Operate the PCU joystick or the emergency lowering button or the GCU lowering button to stow the platform fully;

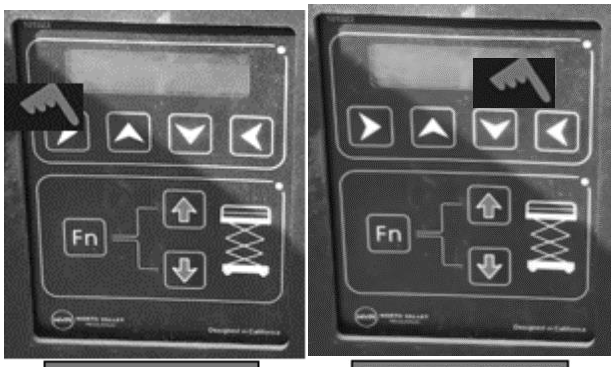
Press the buttons at the same time

2. Press the [Confirm] and [Return] buttons at the same time, and operate the UP/DOWN button to make the ECU display "Select/Enter calibration". Press the [Confirm] button to enter the calibration selection menu;



Press the Down button | Enter the calibration interface

3. Press the DOWN button to select "Enter no load calibration", and press [Confirm] button to enter no-load calibration mode.



Enter password | Start calibration

4. After pressing the [Confirm] button, the ECU will switch to "Enter passWord:" interface, press the [Return] button four times in the page number input interface, and then press the [Confirm] button to enter the corresponding calibration process.
5. After the full load calibration process is started, the no-load calibration process is as follows:
   a) The platform is lifted intermittently until the platform reaches the upper limit position;
   b) After the horn sounds 5 times, the platform descends continuously;
   c) After the platform is lowered to the lowest position, the horn stops sounding;
   d) The platform is continuously lifted to the upper limit position;
   e) After the horn sounds 5 times, the platform continuously descends to the bottom;
   f) The horn stops sounding and the calibration is completed.
6. If the calibration fails, the horn will sound repeatedly, and the calibration needs to be carried out again.
7. If the calibration is successful, the machine will enter the normal working state and have the correct load detection function.
8. If calibration is required when any element is replaced or the machine is worn, repeat the process mentioned above.

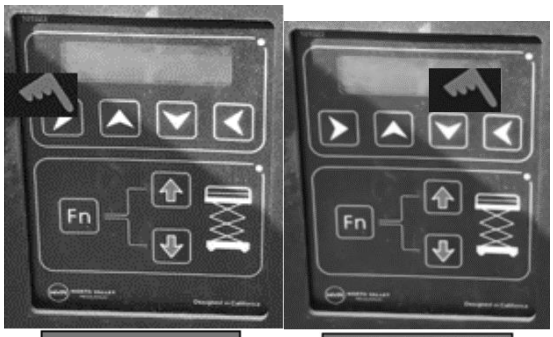
4.7.2 Rated load calibration

Turn on the power supply of the machine

1. Operate the PCU joystick or the emergency lowering button or the GCU lowering button to stow the platform fully;

Press the buttons at the same time

2. Press the [Confirm] and [Return] buttons at the same time, and operate the UP/DOWN button to make the ECU display "Select/Enter calibration". Press the [Confirm] button to enter the calibration selection menu;
3. Press the DOWN button to select "Enterfullload calibration", and press the [Confirm] button to enter the rated load calibration mode.

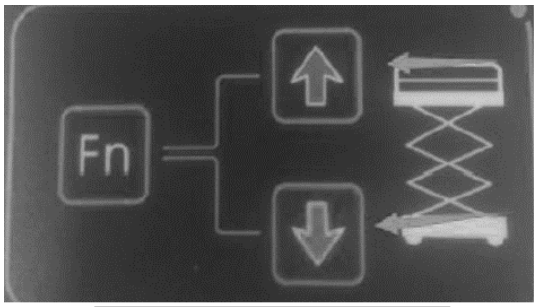


Enter password　　Start calibration

4. After pressing the [Confirm] button, the ECU will switch to "Enter passWord:" interface, press the [Return] button four times in the page number input interface, and then press the [Confirm] button to enter the corresponding calibration process.
5. After the full load calibration process is started, the no-load calibration process is as follows:
   a) The platform is lifted intermittently until the platform reaches the upper limit position;
   b) After the horn sounds 5 times, the platform descends continuously;
   c) After the platform is lowered to the lowest position, the horn stops sounding;
   d) The platform is continuously lifted to the upper limit position;
   e) After the horn sounds 5 times, the platform continuously descends to the bottom;
   f) The horn stops sounding and the calibration is completed.
6. If the calibration fails, the horn will sound repeatedly, and the calibration needs to be carried out again.
7. If the calibration is successful, the machine will enter the normal working state and have the correct load detection function.
8. If calibration is required when any element is replaced or the machine is worn, repeat the process mentioned above.

4.8 Overload function

4.8.1 Overload function activation



Select platform mode

1. After the full load calibration is completed, press the "Lift" and "Lower" buttons at the same time before powering on, and then the system enters the parameter setting mode ("Set parameter Enter"), and press the [Confirm] button;
2. Then press the Page-down button until the LCD screen displays "Plat over load is off.if on";
3. Press the [Confirm] button to select the

function switch, and if "is On.if Off" is displayed, it means the function is switched on.

4.8.2 Rated load verification

1. After the calibration is completed and the overload function is switched on, lift the fork with GCU to verify that the fork can be lifted to the calibrated height, and if not, adjust the proportion value as follows (the maximum fluctuation of the proportion value is 50).

Enter the selection interface

2. Before the machine is powered on, press and hold the “Lift” and “Lower” buttons at the same time, turn the key to the GCU position, enter "Set parameter Enter", press the [Confirm] button, and enter the function selection interface.

Select the parameter

3. Press the Page-up button, select "overload_time time" and press the [Confirm] button to enter.

Adjust the parameter as required

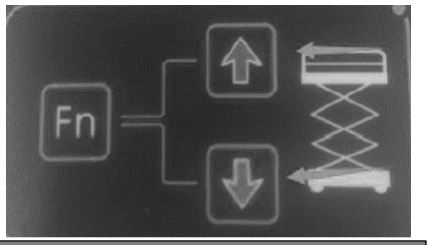
4. Press the Page-up/Page-down button to adjust the parameters. After the adjustment is completed, switch off the power supply and then switch on the power supply for verification, and if the requirements are not met, adjust the parameters as per the above-described steps again.

4.8.3 Test with 1.2 times rated load

1. Platform loading:
   g) Drive the machine to the counterweight hoisting point, with the platform of the machine directly below the traveling crane;
   h) Hoist the counterweight of 1.2 times the rated load to the center of the platform.
2. Start the machine under test to carry out lifting.

Control criteria: Neither lifting nor lowering can be achieved, and the load limiter works.

4.8.4 Parameter setting



Press and hold the buttons at the same time

1. Turn on the emergency stop switches of PCU and GCU, turn the key to the neutral position, press UP and DOWN buttons on the GCU, and meanwhile turn the key switch to GCU

position to allow the system to enter the parameter setting mode;

2. Then, press the “Lift” or “Lower” button, and the LCD screen will display "Set parameter enter"
3. Press the enable button to access the Select Options screen, and press the up and down buttons to adjust the options, and then press the enable button to enter the OI_percent_UP percent mode.
4. Press the up and down buttons to adjust the parameter value so that no alarm is sounded during lifting when the load reaches to the rated value, and an alarm is sounded when the load reaches the 1.2 times rated value. If the requirement is not met, it is necessary to adjust it accordingly.

4.9 Load test

4.9.1 Rated load test

SR3369E:

1. Extend the extension platform into place, place a 314Kg counterweight on the main platform and a 140Kg counterweight on the extension platform;
2. Lift and lower the test machine fully for 3 times respectively, and conduct normal start and stop for 2-3 times in the process. And conduct platform extension operation.

SR4069E:

1. Extend the extension platform in place, place a 225Kg counterweight on the fixed platform and a 140Kg counterweight on the extension platform;
2. Lift and lower the test machine fully for 3 times respectively, and conduct normal start and stop for 2-3 times in the process. And conduct platform extension operation.

Control criteria: There is no abnormal noise, jitter, impact, deformed or cracked structure during lifting and lowering; the platform extends smoothly without abnormal noise, and the hydraulic system does not leak.

4.9.2 Load test (1.2 times rated load)

SR3369E:

1. Extend one side of the platform in place, place a 376.8Kg counterweight on the fixed platform and a 168Kg counterweight on the extension platform;
2. Lift and lower the test machine fully for 3 times respectively, and conduct normal start and stop for 2-3 times in the process. And conduct platform extension operation.

SR4069E:

1. Extend one side of the platform in place, place a 270Kg counterweight on the fixed platform and a 168Kg counterweight on the extension platform;
2. Lift and lower the test machine fully for 3 times respectively, and conduct normal start and stop for 2-3 times in the process. And conduct platform extension operation.

Control criteria: There is no abnormal noise, jitter, impact, deformed or cracked structure during lifting and lowering; the platform extends smoothly without abnormal noise, and the hydraulic system does not leak.

4.10 Inspection of platform settlement (rated load)

1. After lifting the platform to any position, measure the settlement of the work platform within 20min after braking with the hydraulic oil pressure not above 40℃;
2. Measurement method: park the vehicle on a flat ground, lift the platform to any position, turn on the laser range finder, place the laser range finder on the rear side of the chassis, adjust the positioning point to make it projected to the bottom of the platform bottom

plate, set it still for 20min, and after this 20min, measure the height of the front and rear platforms, make records and calculate the height difference.

Target settlement of platform: 50±15mm;

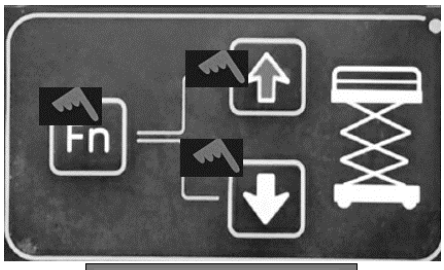
CAUTION:

1. Platform settlement is to be detected when the machine is under rated load.

2. Do not move the laser range finder during the measurement.

4.11 No-load lifting time

4.11.1 No-load lifting time test



Platform lifting switch

1. Lifting time: Move the machine under test to a flat ground, extend and level the platform outriggers, press the enable switch and UP switch in the GCU mode to lift the platform, and press the stopwatch switch to start timing. When the platform is lifted to the highest point, release the platform UP switch, and press the stopwatch switch again to stop timing. The value displayed on the stopwatch is the lifting time; repeat the above steps twice;

Target lifting time of SR3369E: 39±4(s);

Target lifting time of SR4069E: 61±4(s);

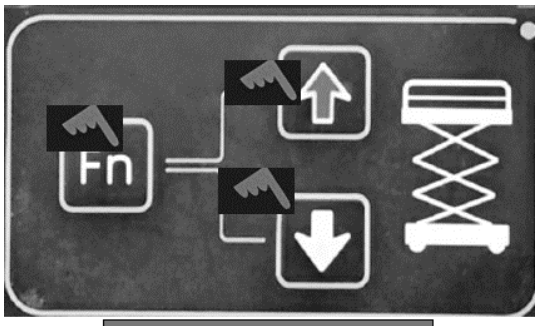
2. Lowering time: After measuring the lifting time, operate the machine reversely with the same method to measure the lowering time;

Target settlement time of SR3369E: 46±4(s);

Target settlement time of SR4069E: 55±4(s);

3. If the time requirement is not satisfied, the parameters shall be adjusted according to the parameter adjustment procedure as appropriate.

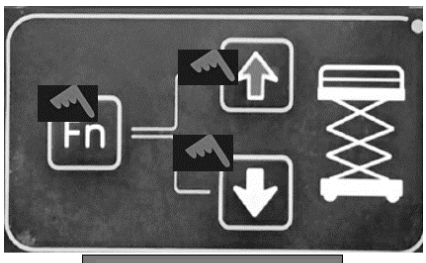
4.11.2 Adjustment of lifting speed



Platform lifting switch

1. Shut down the machine, turn on the emergency stop switches of PCU and GCU, press and hold UP and DOWN buttons on the GCU simultaneously, and turn the key switch to GCU position. In this case, the parameter configuration mode of the system is activated, and “Set parameter Enter” is shown on the display screen, and then press the Confirm button:
2. Press the Page-down button to select the "Max lift speed" interface, and press the [Confirm] button.
3. After pressing the [Confirm] button, the screen will display "Lift speed 55,100". Press the Page-up/Page-down button to adjust and set the parameter as required. After the setting is completed, perform verification, and if it still does not meet the requirement, continue the adjustment according to the above-described steps.

4.11.3 Adjustment of lowering speed



Platform lifting switch

1. Shut down the machine, turn on the emergency stop switches of PCU and GCU, press and hold UP and DOWN buttons on the

GCU simultaneously, and turn the key switch to GCU position. In this case parameter configuration mode of the system is activated, and “Set parameter Enter” is shown on the display screen;

2. Press the Page-down key to select the "Max down speed" interface, and press the [Confirm] button;
3. After pressing the [Confirm] button, the screen will display "Down speed 55,100". Press the Page-up/Page-down button to adjust and set the parameter as required. After the setting is completed, perform verification, and if it still does not meet the requirement, continue the adjustment according to the above-described steps.

4.12 Lifting height test

1. Extend the extension platform and ensure that the platform limiter locks the extension platform;
2. Lift the platform to the highest point and measure the distance from the ground to the bottom of the extension platform with a laser range finder;

Test target value of SR3369E: 9.7±0.05 (m);

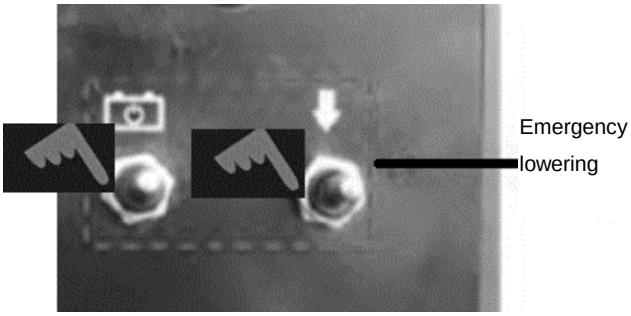
Test target value of SR4069E: 11.9±0.05 (m);

Instructions for use of the laser range finder:

3. Press the upper middle red (MEAS) button of the laser range finder, align the laser dot with the bottom surface of the extension platform, press the upper left blue (Timer) button of the laser range finder, and press the red (MEAS) button again for 5s (adjustable). In this case, the height data is shown on the display screen;

CAUTION: The laser range finder shall be placed on a flat ground; the steel plate on the bottom of the extension platform rather than the reinforcing rib shall be selected as the test position of platform; The test height may be adjusted by longitudinally positioning the upper limit travel switch until it meets the requirement.

4.13 Emergency lowering test

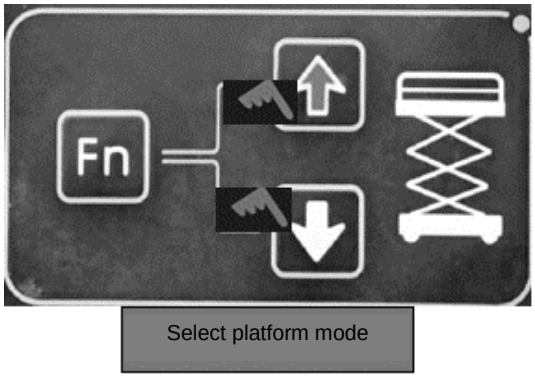


1. After the platform is lifted to the top (SR3369E: 9.7m/SR4069E: 11.9m);
2. Turn on the emergency stop switch, turn the key to the PCU position, and press and hold the buttons shown with both hands at the same time;

Control criteria: The platform descends from the top to the lowest point, and the emergency power unit has no abnormality.

4.14 Speed parameter adjustment

4.14.1 High-speed driving

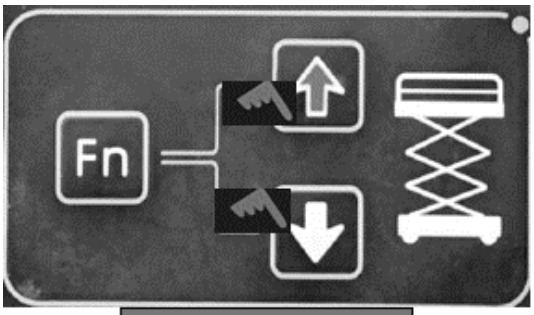


1. Shut down the machine, turn on the emergency stop switches of PCU and GCU, press and hold UP and DOWN buttons on the GCU simultaneously, and turn the key switch to GCU position. In this case parameter configuration mode of the system is activated, and “Set parameter enter” is shown on the display screen;
2. Press the Page-down button to select the

"Max high drive speed" interface, and press the [Confirm] button;

3. After pressing the [Confirm] button, the screen will display "High speed drv 98,100"; press the Page-up/Page-down button to adjust and set the parameters, and after the setting is completed, perform verification, and if it still does not meet the requirement, continue the adjustment according to the above-described steps.

4.14.2 Low speed driving



Select platform mode

1. Shut down the machine, turn on the emergency stop switches of PCU and GCU, press and hold UP and DOWN buttons on the GCU simultaneously, and turn the key switch to GCU position. In this case parameter configuration mode of the system is activated, and “Set parameter enter” is shown on the display screen;
2. Press the Page-down button to select the "Max low drive speed" interface, and press the [Confirm] button;
3. After pressing the [Confirm] button, the screen will display "Low speed Drv 50,80". Press the Page-up/Page-down button to adjust and set the parameter as required. After the setting is completed, perform verification, and it still does not meet the requirement, continue the adjustment according to the above-described steps.

4.15 No-load braking distance test

1. Select the high-speed driving mode, and start the machine 10m before the power cut-off point;
2. After the center of front wheels reaches the power cut-off point, release the power, and ensure that the machine stops automatically;
3. Measure the distance from the power cut-off point to the center of front wheels of the machine after stop as the braking distance of the machine.

Target value: 1000-1500mm;

CAUTION: The machine under test shall be kept in the no-load state, with the fork retracted; Before walking, the machine shall be adjusted properly so that it can travel on a straight line; attention shall be paid to the driving safety;

4.16 No-load lifting and walking speed test

1. Turn the start switch to the PCU position, adjust the speed to low speed mode, and drive the vehicle to the test road at low speed;
2. Start timing when the center of front wheels of the machine crosses the first clearance line of the concrete ground, and stop timing when the center of front wheels of the machine crosses the finish line, i.e. record the time for the trolley to travel through the test road for a total of 50m.

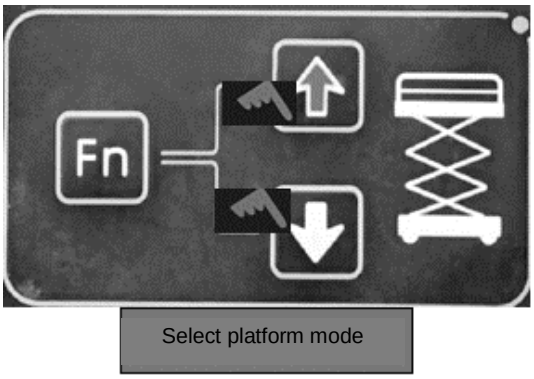
Target value: 0.5 km/h, i.e. 360(s);

CAUTION: The machine under test shall be kept in the no-load state, with the fork lifted; Before walking, the machine shall be adjusted properly so that it can travel on a straight line; attention shall be paid to the driving safety;

3. After the forward walking test, the reverse walking speed test shall be carried out in the same way by adopting the same test method

and criteria;

4.17 No-load lifting and walking speed parameter adjustment



1. Shut down the machine, turn on the emergency stop switches of PCU and GCU, press and hold UP and DOWN buttons on the GCU simultaneously, and turn the key switch to GCU position. In this case parameter configuration mode of the system is activated, and “Set parameter enter” is shown on the display screen;
2. Press the Page-down button to select the "Max raised drive speed" interface, and press the [Confirm] button;
3. After pressing the [Confirm] button, the screen will display "Raised speed 8,70". Press the Page-up/Page-down button to adjust and set the parameter as required. After the setting is completed, perform verification, and it still does not meet the requirement, continue the adjustment according to the above-described steps.

4.18 Gradeability test and parking brake test (35%)

1. Carry out the gradeability test on the gradeability test platform with a gradient of 35% twice in the forward and reverse directions respectively, with the platform not loaded and stowed;

Control criteria: Both front and rear wheels can climb the slope;

2. Stop the machine on the gradeability test platform with a gradient of 35%

Control criteria: The machine doesn’t slip.

CAUTION: Control the speed during the uphill and downhill driving test;

4.19 Floating test

Carry out the floating test, with the fork retracted and lifted respectively (until the climbing indicator light is on):

1. Make the four wheels cross the pit with a depth of 0.1m, during which one wheel falls into the pit while the others are placed on a flat ground;

Floating test criteria standard: 1. With the fork retracted: the front, rear, left, and right wheels shall be all tested, and the four wheels shall be able to touch the ground simultaneously after the machine fall into the pit;

2. With the fork lifted: the front, rear, left, and wheels shall be all tested, and the floating function is disabled after the machine falls into the pit.

4.20 Outrigger limit test

1. Drive the machine to a flat concrete ground, extend the outriggers, and perform automatic leveling.
2. Extend the two front or rear outriggers simultaneously to the limit state, and maintain this state for half a minute;
3. After the two front or rear outriggers are extended to the limit state, perform automatic leveling of the machine through PCU, and maintain this state for half a minute;

Inspection criteria:

1. The oil circuit system of the outrigger is sealed properly, without oil leakage;

2. The fastening bolts of the outrigger are not loose, and the relevant parts of the

outrigger such as the ball-head outrigger base are free of breakage, weld crack and other quality defects;

4.21 Basic operation

1. Basic operation principles

1） The electrical connections of the vehicle are well installed with a complete circuit formed, the sensor works normally, the main power supply is connected, and the start switch and emergency stop switch function normally.

2） When the start switch is turned on, the PCU or GCU is selected, and the emergency stop buttons on PCU and GCU are pulled up, no alarm and error code are activated.

3） The vehicle works normally, and the action of vehicle cannot be triggered unless the enable button and function selector button are pressed and the corresponding joystick is moved.

2. Operations on ground control unit (GCU)

1） Platform lifting

Turn on the start switch in the ground control mode, and after the system works normally, press the lift function button and the lifting button at the same time to lift the platform; or press the lifting function button and the lowering button at the same time to lower the platform.

2） Emergency lowering

When the platform fails to be lowered due to a fault, the emergency lowering function can be enabled, which is to lower the platform to the safe position by using the electric energy in the battery. To lower the platform in case of emergency, press the emergency lowering function enable button and the emergency lowering button at the same time.

3. Operations on platform control unit (PCU)

1） Forward/backward travel

a） After the system is initialized, check whether there are people, animals or other obstacles around the vehicle, and press the horn button to remind the people around that the vehicle is about to start.

b） Press the travel function button, press the enable button on the PCU, and push the enable joystick forward or backward at the same time to make the vehicle travel forward or backward.

c） When the enable switch on the joystick is released or the joystick is in the neutral position, the vehicle will stop moving.

2） Left/right turning

Press the travel function button and the enable button on the PCU, and press the left turn or right turn button of the thumb rocker switch at the same time to make the vehicle turn as desired; release the enable switch or the left turn/right turn button to stop turning.

3） Platform lifting/lowering

Turn the start switch to the PCU position, press the lifting function button, press and hold the enable switch, and meanwhile, move the joystick in the direction of blue arrow to lift the platform, or move the joystick in the direction of yellow arrow to lower the platform.

4） Outrigger operation

Turn the start switch to the PCU position, press and hold the outrigger function enable button of the corresponding outrigger (four outriggers in total), press and hold the enable switch, and meanwhile move the joystick in the direction of yellow arrow to extend the outrigger, or move the joystick in the direction

of blue arrow to retract the outrigger. When the outrigger is landed on the ground firmly, the indicator light on the button will go on.

5） Automatic leveling

The vehicle needs to be leveled via outriggers when it is tilted, and the control system has the outrigger automatic leveling function. For the purpose of automatic leveling, turn the start switch to the PCU position, press and hold the outrigger automatic leveling button, press and hold the enable switch, and meanwhile, push the joystick in the direction of yellow arrow or blue arrow to extend or retract the outrigger, and after the vehicle is leveled, the 4 indicator lights on the outrigger button will go on, and when you push the joystick at this time, an audible alarm will be given, and the outrigger cannot be extended, indicating that the vehicle has been leveled.

Chapter Ⅴ Maintenance

5.1 Compliance

1) The operator can only perform routine maintenance items as specified in this manual.
2) Regular maintenance inspections should be performed by trained service technicians as required by the manufacturer

Maintenance symbol legend

The following symbols appear in this manual to indicate the relevant meaning in the operation instructions. When one or more symbols appear in front of the maintenance procedure, the meanings expressed are as follows.

It indicates that a tool is required to perform this procedure.

It indicates that a new part is required to perform this procedure.

It indicates that the engine must be cooled before performing this procedure

5.2 Checking the Safety Manual

It is necessary for safe equipment operation to keep the Operator and Safety Manual in good condition. The manual and each equipment should be stored in a container provided on the work platform. An illegible or missing manual will not provide the necessary safety and operation information for safe operation.

1) Check that the storage container is on site and in good condition.
2) Check that the Operator, Responsibility, and Safety Manual is complete in the storage container on the work platform.
3) Check that each page of the manual is identifiable and in good condition.
4) Put the manual in the storage file box after use.

⚠ If you need to replace the manual, please contact the company's service personnel.

5.3 Checking the labels and signs

It is necessary for safe operating equipment to keep all safety and instructions labels and signs in good conditions. Labels are used to remind operators and staff of the possible hazards when operating this equipment. User operation and maintenance information is also provided. An illegible label does not remind the staff of steps or hazards, and may also result in unsafe operating conditions.

Refer to the label section in this manual and use the label menu and instructions to check whether all labels are in place.

Check all the labels for clarity and damage and immediately replace any damaged or illegible ones.

⚠ If you want to replace the label, please contact the company's service personnel.

5.4 Checking for damaged, loose or missing parts

This check should be performed every 8 h or every day.

Daily equipment status checks are necessary for safe equipment operation and good equipment performance. Incorrect location and repair damage, and loose or missing parts may result in unsafe operating conditions.

1) Check the entire equipment for damage and incorrect installation or loss of parts, including:

- Electrical components, wires and cables
- Hydraulic hoses, joints, valve blocks, hydraulic cylinders
- Hydraulic tank

- Wear pad
- Tire and wheel
- Limit switch, horn
- Nuts, bolts and other fasteners
- Platform extension
- Platform entry port
- Indicators and alarms
- Safety arm
- Scissor arm pins and fasteners
- Platform control handle
- outrigger cover and foot pad

Check the entire machine for:

- Crack in the weld or structural member
- Check the platform, frame and chassis for deformation or open welding
- Dent or damage to the machine
- Make sure all structural members and other critical components are complete, and all associated fasteners and pins are in the right position and tightened
- The platform guide rail has been installed, the platform guide rail bolts are in place and the bolts are properly tightened.

Caution:

If the platform must be lifted to check the machine, make sure the safety arm is in the right position. See the "Operating Instruction" section.

5.5 Checking the wires

1) This check should be performed every 250 h or quarterly, whichever comes first.
2) It is important for safe operation and good machine performance to keep the wires in good conditions. Failure to find and replace the burn-out, scratched, corroded or bent wires will result in unsafe operating conditions and damage to the parts.

Risk of electric shock/explosion

Contact with live circuits may cause serious injury or death. Do not wear rings, watches or other jewelry.

1) Check if the ground wire under the chassis is missing or damaged.
2) Check the following areas for burn-out, scratched, corroded, bent or loose wires:

- Rear axle: Driving motor, limit switch
- Tank side: Ground control unit inside, wire harness connection, motor control unit, battery charger
- Battery side: Battery, fuse
- Machine: Platform, platform control unit, wire harness connection

3) Check whether all wire harness connectors are coated with insulating grease:

- Ground control unit
- Platform control unit
- Motor Control unit
- Valve component
- Limit switch
- Sensor

5.6 Checking the battery

Good battery condition is critical to normal machine performance and safe operation. Improper electrolyte levels or damaged cables and wires may result in component damage and dangerous situations.

Caution:

This check is not required for machines that are equipped with sealed or maintenance-free batteries.

Warning:

Risk of electric shock. Contact with an electrical circuit may result in death

or serious personal injury. Remove all rings, watches or other accessories.

Warning:

Risk of body injury. The battery contains acidic substances. Avoid spilling or touching the acid in the battery. Soda and water can be used to neutralize the overflowing battery acid.

Caution:

This check should be performed after the battery is fully charged.

1) Wear protective clothing and goggles.
2) Make sure the battery cable is securely wired and not corroded.
3) Make sure the battery lock bracket is stable.
4) Remove the battery vent cap.
5) Check the battery acid level. If necessary, fill the distilled water through a filling pipe at the bottom of the battery. Do not add excessive distilled water.
6) Install the vent cap.

Caution:

Adding a terminal protector **and an anti-corrosion sealant can help eliminate the corrosion on the battery terminals and cables.**

5.7 Checking the electrical contactors

This check should be performed every 250 h or quarterly, whichever comes first.

It is important for safe operation of the machine to keep the electrical contactor in good condition. Failure to find the worn or damaged contactors in a timely manner may endanger the work conditions and cause component damage.

1） Open the battery side cover.

2） Visually check the following aspects of the contactor:

Transitional burning

Transitional bending

Transitional pitting

Warning:

Risk of motor burn-out. Contact with an electrical circuit may result in death or serious personal injury. Remove all rings, watches or other accessories.

Caution:

In the event of any damage, the contactor should be replaced.

5.8 Checking the tires and wheels

This check should be performed every 250 h or quarterly, whichever comes first.

It is important for safe operation and good performance to keep the tires and wheels in good conditions. Failure of the tires and wheels may cause the machine to roll over. Failure of finding and repairing the problem in time may cause damage to the machine.

1） Check the tire treads and sides for scratches, cracks, punctures or other abnormal wear.

2） Check the wheels for damage, bending or cracking.

3) Check each lug nut for proper torque: 305±25N•m

5.9 Checking the hydraulic tank vent cap

This check should be performed every 100 hours or every month, whichever comes first.

1) An unobstructed hydraulic tank cover is essential for good mechanical performance

and long service life. A dirty or clogged vent cap may cause poor machine performance. Frequent checks should be performed under the harsh working enviroN•ment.

① Remove the vent cap from the hydraulic tank cover.

② Check the ventilation condition.

Result: Air can pass through the vent cap.

Result: If the air fails to pass through the vent cap, clean or replace it. Proceed with step 3.

Note: When checking the tank cover for ventilation, the air should pass freely.

3) Carefully clean the tank vent cap with a mild solvent and dry it with low pressure compressed air. Repeat step 2.

4) Install the hydraulic tank vent cap.

5.10 Checking the leakage of hydraulic oil

Check for leakage every 8 h or every day.

⚠ Risk of personal injury. Leaking hydraulic oil under pressure can pierce or burn skin.

1) Check the hydraulic oil sediments, oil drops or oil residue in the following areas.

- All hydraulic cylinders
- All valve elements
- All pipes and fittings
- Reducer
- Filter
- Hydraulic tank
- Hydraulic pump
- Under the chassis
- Axle
- The ground area under the equipment.

5.11 Checking the hydraulic filter

It should be checked or replaced every 500 h or half a year.

⚠ If the working enviroN•ment is dusty, this check should be performed more frequently.

Replacing the hydraulic filter is necessary to maintain good machine performance and long service life. A dirty or clogged filter may cause the machine performance degradation, and continuous operation may result in component damage. The filter should be replaced more frequently in extremely dirty working conditions.

⚠ Risk of personal injury. Be careful of hot oil. Exposure to hot oil may cause severe burns.

⚠ This step should be performed when the machine is stopped.

Replace the hydraulic tank return filter

1) This step should be performed every 500 h or annually, whichever comes first.

2) Replacing the return filter is essential for good performance and service life of the machine. A dirty or clogged filter may affect the machine performance and continued operation may result in parts damage. The filter element should be replaced more frequently in harsh working conditions.

Caution: Risk of burn

Be careful of hot oil. Exposure to hot oil may cause severe burns.

① Remove the filter with a wrench. Clean the area of contact between the hydraulic filter and the filter head.

② Apply a thin layer of new oil to the gasket of the new hydraulic filter.

③ Install a new filter and tighten it.

④ Record the date of replacement on the filter with a marker.

⑤ Remove all traces of oil spilled in the replacement process.

⑥ Turn the key switch to the ground control unit and pull out the red emergency stop buttons on the ground and platform control units.

⑦ Press the lift function button.

⑧ Check the filter components for oil leakage.

5.12 Replacing the hydraulic tank air filter

It should be replaced every 1000 h or yearly, and should be replaced more frequently in the dusty working enviroN•ment.

⚠This step should be performed when the machine is stopped.

1） Remove the filter element.

2） Clean the inside of the cylinder and the end cap with a wet cloth.

3） Install a new air filter element.

5.13 Checking the hydraulic oil level

It should be checked every 8 h or every day.

Maintaining the hydraulic fluid at the proper oil level is essential for machine operation. If the hydraulic oil is at an unsuitable oil level, the hydraulic components may be damaged. Through daily inspections, the inspector can determine changes in the hydraulic oil level which can indicate problems with the hydraulic system.

⚠Caution:

This step should be performed when the platform is in the retracted state and the machine is stopped.

1) Park the equipment on a flat surface. The platform is in the retracted state.

2) Check the oil mark on the hydraulic oil tank. When the fork is in the stowed state, the hydraulic oil level should be at the "LH" position of the level gauge (long level gauge) or 1 / 2 - 2 / 3 position of the level gauge (short level gauge). If necessary, fill the hydraulic oil to the specified position.

5.14 Visual Inspection of the Hydraulic Oil

Collect a sample of hydraulic oil and place in a clear container. Visually inspect the hydraulic oil for the following:

- Color: oil should be a clear, light-honey colored.
- Appearance: oil should be clear and not cloudy or visibly distorts the view through the sight glass or container.
- Contains no particles, foreign objects, or other contamination.
- The hydraulic oil can be inspected by smell (can smell “hot” but not “burnt”) or rubbing between fingers (should feel viscous and free of any rough feel due to particles)

If the hydraulic oil passes all of the above inspections, continue the scheduled maintenance intervals. If the hydraulic oil fails any of the above inspections, the hydraulic oil must be tested by an oil distributor or replaced.

Note: If the hydraulic oil has not been replaced for two years, the oil must be tested every quarter by an oil distributor until the oil fails the test and is replaced. After the oil has been replaced, continue the scheduled quarterly maintenance inspection.

5.15 Test or Replace the hydraulic oil

The hydraulic oil should be changed every 2000 h or two years, whichever comes first.

⚠If the hydraulic oil is not changed during the two-year inspection, it should be checked quarterly. The hydraulic oil

should be changed when it is found unqualified after checking.

⚠ This step should be performed when the frame is in the retracted position.

⚠ When removing the hose assembly or fitting, the O-ring or hose end on the fitting must be replaced and tightened to the specified torque during installation.

Replace hydraulic oil and oil suction filter

Park the vehicle on a level ground with the vehicle in a stowed position.

1) Close the ball valve on the hydraulic tank (if equipped).

⚠ Component damage hazard.

No action can be taken when the ball valve of the hydraulic tank is closed, otherwise it will cause component damage. If the ball valve is closed, remove the key from the key switch and hang a warning sign on the equipment.

⚠ Warning: Risk of body injury.

The sprayed hydraulic oil may penetrate and burn the skin. Slowly loosen the hydraulic connections to gradually reduce the oil pressure. Prevent hydraulic oil for spraying.

2) Remove the drain plug from the hydraulic tank.
3) Completely drain the hydraulic oil in the hydraulic oil tank into a suitable container. In order to speed up the oil drain, open the oil filler cap of the oil tank.
4) Remove the suction filter from the hydraulic tank.
5) Flush the inside of the hydraulic oil tank with a mild solvent.（ First clean one side with chemical cleaning agent. After drying, rinse with clean hydraulic oil and drain the cleaning oil.)
6) Clean the foreign matters adsorbed by the ring magnet.
7) Install a new oil suction filter.
8) Install the upper drain plug.
9) Add the hydraulic oil into the hydraulic oil tank until the liquid level is at the "LH" position of the observation gauge (long liquid level gauge) or 1 / 2 - 2 / 3 position of the liquid level gauge (short liquid level gauge). Overflow is strictly prohibited.
10) Wipe off hydraulic oil that may spill.
11) Open the ball valve on the hydraulic tank.

⚠ Component damage hazard.

After installing the hydraulic tank, make sure to open the two hydraulic tank ball valves and fill the pump.

⚠ Note:

Make sure to use pipe thread sealant when installing the drain plug and filter.

12) Check the function of all machines through a full cycle and check for oil leakage.
13) After a working cycle, recheck the oil tank level and add oil to "LH" (long level gauge) or 1 / 2 - 2 / 3 of the level gauge (short level gauge).

5.16 Checking the oil level in the reducer

This step should be performed every 250 h or quarterly, whichever comes first.

Incorrect oil level in the reducer may result in

performance degradation and continuous operation may result in component damage.

1) Rotate the drive unit until one plug is at the highest position and has an angle of 90 degrees with the other plug.
2) Remove the other plug and check the oil level.

Result: The oil level should be the same as the bottom of the side plug hole.

3) When necessary, remove the upper plug and fill the oil until the oil level is the same as the bottom of the side plug hole.
4) Apply the pipe thread sealant to the plug and install the plug in the reducer.
5) Repeat this step for each reducer.

Condition	Oil viscosity brand
30°C＜The lowest temperature	85W/140
-10°C＜The lowest temperature＜30°C	85W/90
-30°C＜The lowest temperature＜-10°C	80W/90
The lowest temperature＜-30°C	75W

5.17 Replacing the reducer gear oil

The first maintenance should be performed after 50 h, and the second maintenance should be performed at an interval of 1000 h or annually, whichever comes first.

Changing the gear oil of the under is necessary to maintain good equipment performance and long service life. Failure to change the gear oil each year may result in performance degradation and continuous operation may result in component damage.

1) Select the reducer to be serviced and drive the equipment till one of the two plugs is at the lowest point.
2) Remove the two plugs and drain the oil completely in a suitable container.
3) Rotate the drive unit until one plug is at the highest position and has an angle of 90 degrees with the other plug.
4) Fill the oil from the reducer's filler hole at a high point till the oil level is the same as that in the side hole at the bottom. Install the plug.
5) Repeat this step for oil filling of each reducer.

Condition	Oil viscosity brand
30°C＜The lowest temperature	85W/140
-10°C＜The lowest temperature＜30°C	85W/90
-30°C＜The lowest temperature＜-10°C	80W/90
The lowest temperature＜-30°C	75W

5.18 Checking or replacing the scissor arm slide block

This step should be performed every 1000 h or annually, whichever comes first.

1) The quality of the scissor arm slide block is critical to the safe operation of the machine. A worn slide block may result in component damage and unsafe working problems.
2) The wear pad should be performed the platform is retracted.

① Measure the height of the wear pads on the chassis and platform rails.

Result: The measurement result is less than 8 mm. Replace the slide block.

② Apply lubricant between the chassis rail and slide block, platform rail and slide block.

5.19 Regular maintenance

Maintenance work on a quarterly, annual and biennial basis must be performed by those who are trained and qualified in the machine maintenance according to the procedures specified in the maintenance manual.

For a machine that has been idle for more than three months, it must be checked quarterly before it is put into operation again

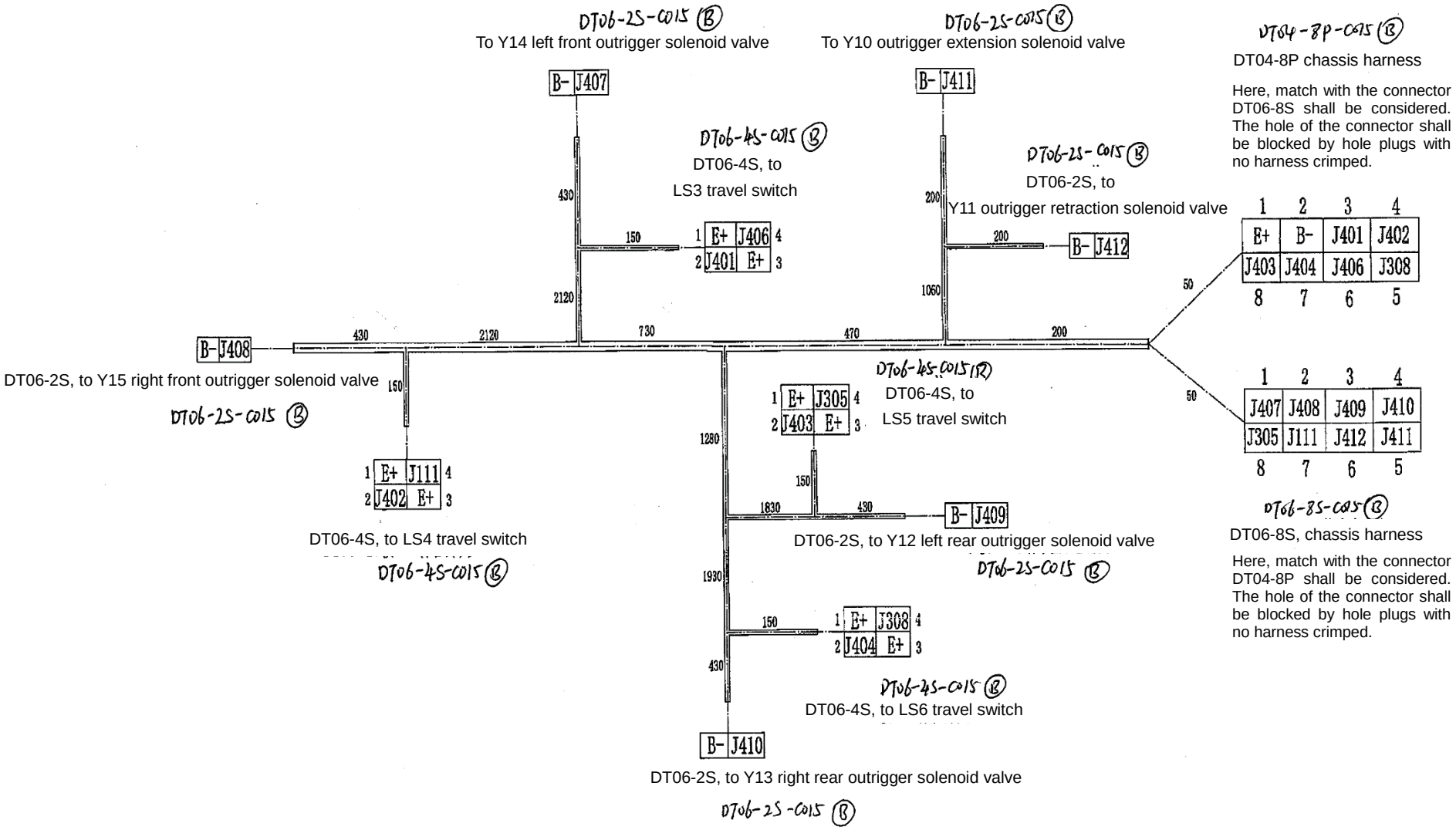
Chapter Ⅵ Appendix

6.1 Machine fault codes

Display	Description	Machine response
01	System initialization error	Stop all actions
02	System communication error	Stop all actions
03	The machine type is not set for the first use	Stop all actions
04	Machine type setting invalid	Stop all actions
05	BMS communication error	Stop all actions
10	BMS Fault	Show alarm only
12	The chassis up or down button is enabled incorrectly when starting	Stop all chassis controls
13	Limit switch redundancy error	Stop lifting and driving
14	Communication failure with ZAPI controller 1	Stop lifting and driving
15	Communication failure with ZAPI controller 2	Stop lifting and driving
16	Outrigger 1 solenoid coil failure	Stop lifting and driving
17	Outrigger 2 solenoid valve coil failure	Stop lifting and driving
19	Outrigger 3 solenoid valve coil failure	Stop lifting and driving
23	Prompt of stopping walking while lifting	Show alarm only
27	Proportional solenoid valve coil error	Stop lifting and driving
31	Pressure sensor error	Stop all actions
32	Angle sensor error	Stop all actions
33	Outrigger 4 solenoid valve coil failure	Stop lifting and driving
34	Perform emergency drop 1S after overload alarm	Save fault code only
35	No load full load calibration data error	Show alarm only
36	low battery alarm	low speed walking
40	Communication interruption with GPS	Stop lifting
41	GPS locking fault	Stop lifting
42	The platform left turn button is pressed incorrectly when starting.	Show alarm only
43	The platform right turn button is pressed incorrectly when starting.	Show alarm only
44	ZAPI controller failure	Show fault only
46	The platform handle enable switch button is pressed incorrectly when starting.	Stop platform control
47	The platform handle is not in the neutral position when starting	The speed drops to the speed after lifting
49	Platform leg button pressed incorrectly during startup	Stop platform controls
50	Left bridge floating coil error	Stop lifting and driving
51	Right bridge floating coil error	Stop lifting and driving
52	Forward coil error	Stop lifting and driving
53	Reversing coil error	Stop lifting and driving
54	Lifting up coil error	Stop lifting and driving
56	Right turn coil error	Stop lifting and driving
57	Left turn coil error	Stop lifting and driving
58	Accumulator pressure sensor error	Stop lifting and driving
59	Floating enable coil error	Stop lifting and driving
68	Low voltage alarm	low speed walking、stop lifting
80	Above 80% load alarm	Alarm only
90	Above 90% load alarm	Alarm only
93	Horizontal calibration error	Stop all actions
94	Calibration error of angle analog limit switch	Stop all actions
99	Above 99% load alarm	Alarm only
OL	Platform overload alarm	Stop all actions
LL	The machine is tilted beyond the safety limit	Stop lifting and driving

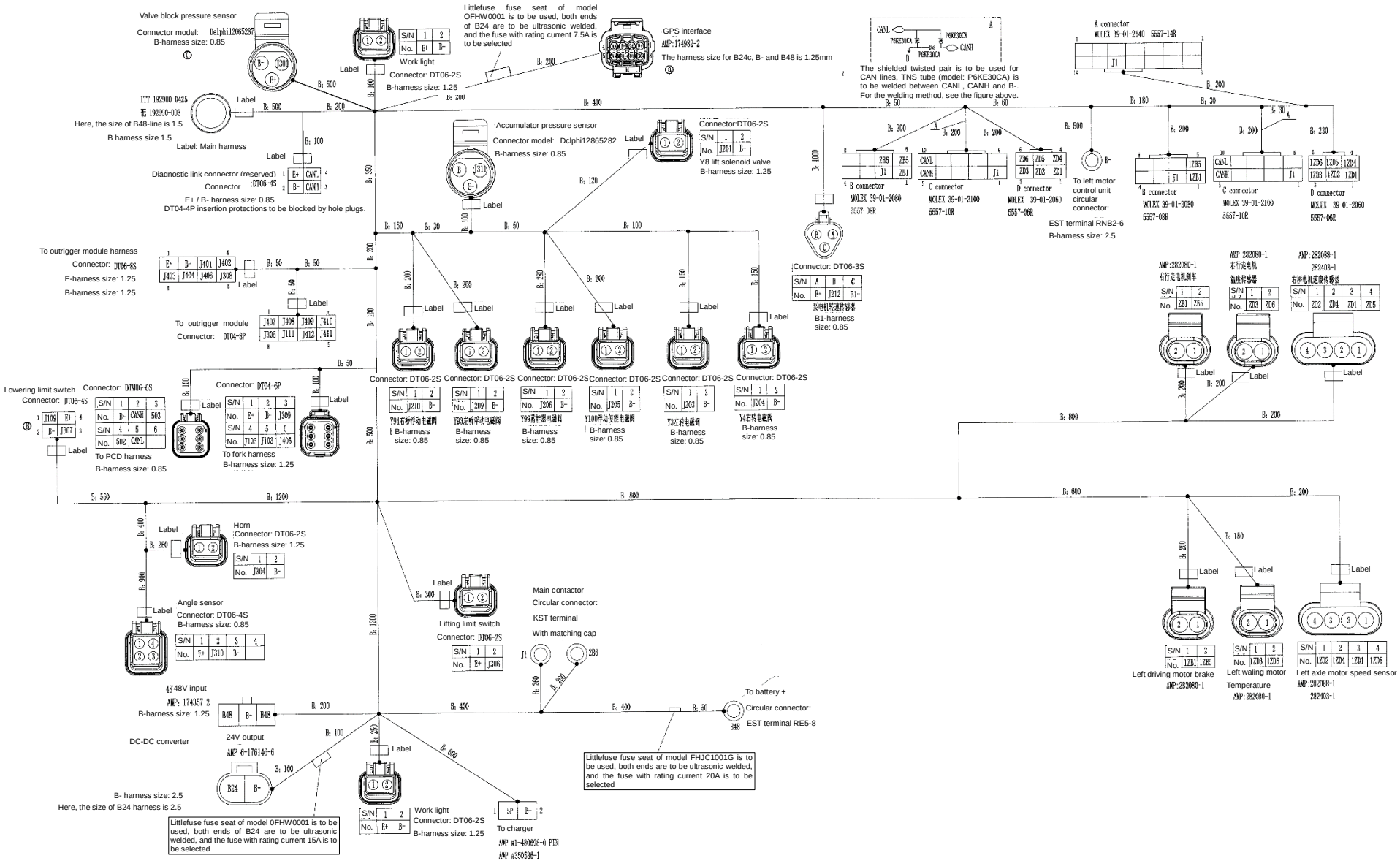
6.2 Description of harness No.

6.2.1 Outrigger module harness



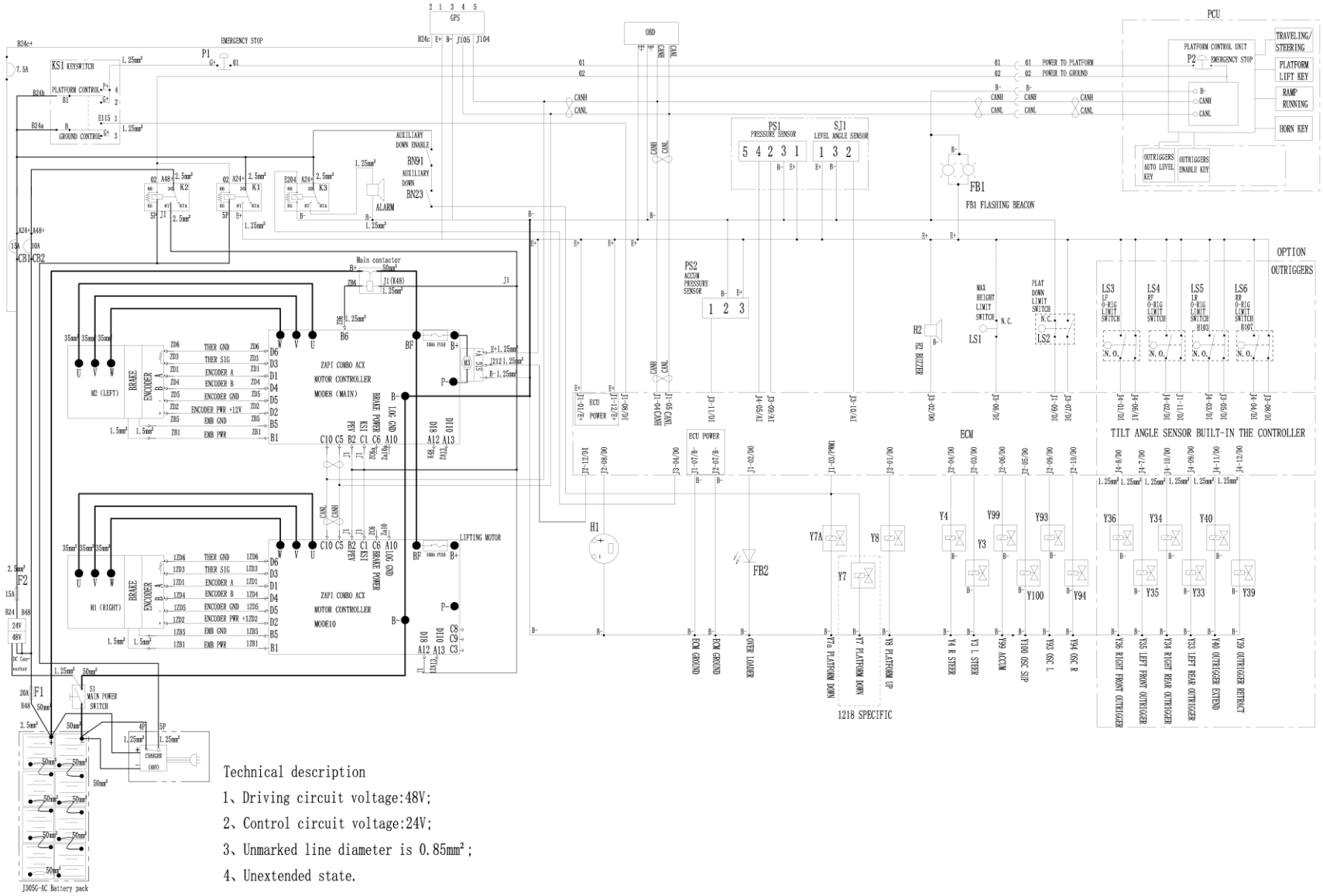
No.	Name	Color	Size	No.	Name	Color	Size
B-	Negative electrode	Black	1.25	J406	Left front outrigger travel switch	White	0.85
E+	Positive electrode	Red	1.25	J404	Right rear outrigger travel switch	White	0.85
J412	Outrigger retraction solenoid valve Y11	White	1.0	J403	Left rear outrigger travel switch	White	0.85
J411	Outrigger extension solenoid valve Y10	White	1.0	J402	Right front outrigger travel switch	White	0.85
J410	Right rear outrigger solenoid valve Y13	White	1.0	J401	Left front outrigger travel switch	White	0.85
J409	Left rear outrigger solenoid valve Y12	White	1.0	J308	Right rear outrigger travel switch	White	0.85
J408	Right front outrigger solenoid valve Y15	White	1.0	J305	Left rear outrigger travel switch	White	0.85
J407	Left front outrigger solenoid valve Y14	White	1.0	J111	Right front outrigger travel switch	White	0.85

6.2.2. Chassis harness



No.	Name	Color	Size	No.	Name	Color	Size
J212	Lift pump speed sensor signal	White		J209	Floating left outrigger Y93	White	
J311	Accumulator pressure switch signal	White		J210	Floating right outrigger Y94	White	
J307	Lower limit switch	White		J205	Floating enable solenoid valve Y100	Red	
J306	Upper limit switch	White		J206	Accumulator solenoid valve Y99	Red	
J201	Platform lifting solenoid valve Y8	Red		J204	Right steering solenoid valve Y4	Red	
J103	Platform lowering solenoid valve Y7	Red		J203	Left steering solenoid valve Y3	Red	
J304	Horn power	Red		J109	Lower limit switch	White	
J406	Left front outrigger travel switch	White		J308	Right rear outrigger travel switch	White	
J310	Angle sensor signal	White		J305	Left rear outrigger travel switch	White	
J309	Lift pressure sensor signal 1	White		ZC9	Steering potentiometer signal	White	
J301	Valve block pressure sensor signal	White		ZD6	Temperature sensor GND	Black	
J1	48V control power supply	Red		ZD5	Encoder GND	Black	
B48	48V battery power	Red		ZD4	Encoder b phase	White	
B24b	24V power	Red		ZD3	Driving motor temperature signal	White	
B24a	24V power	Red		ZD2	Encoder power	Red	
B24	24V power	Red		503	Main power control harness 2	Red	
B-	Power -	Black		502	Main power control harness 1	Red	
E+	Power +	Red		J401	Left front outrigger travel switch	White	
J405	Lift pressure sensor signal 2	White		J402	Right front outrigger travel switch	White	
J111	Right front outrigger travel switch	White		J403	Left rear outrigger travel switch	White	
ZD1	Encoder a phase	White		J404	Right rear outrigger travel switch	White	
ZC9	Steering potentiometer signal end	White		J407	Left front outrigger solenoid valve Y35	Red	
ZC8	Steering potentiometer power end	Red		J408	Right front outrigger solenoid valve Y36	Red	
ZC3	Steering angle sensor ground end	Black		J409	Left rear outrigger solenoid valve Y33	Red	
ZB6	Main contactor control ground end	White		J410	Right rear outrigger solenoid valve Y34	Red	
ZB5	Electric brake power	Red		J411	Outrigger extension solenoid valve Y40	Red	
ZB1	Electric brake ground	White		J412	Outrigger retraction solenoid valve Y39	Red	
5P	Charging interlock	White		B1-	Pump motor ground harness	Black	

6.3 Electrical schematic diagram（SR3369E/SR4069E）



Technical description

1、Driving circuit voltage:48V;

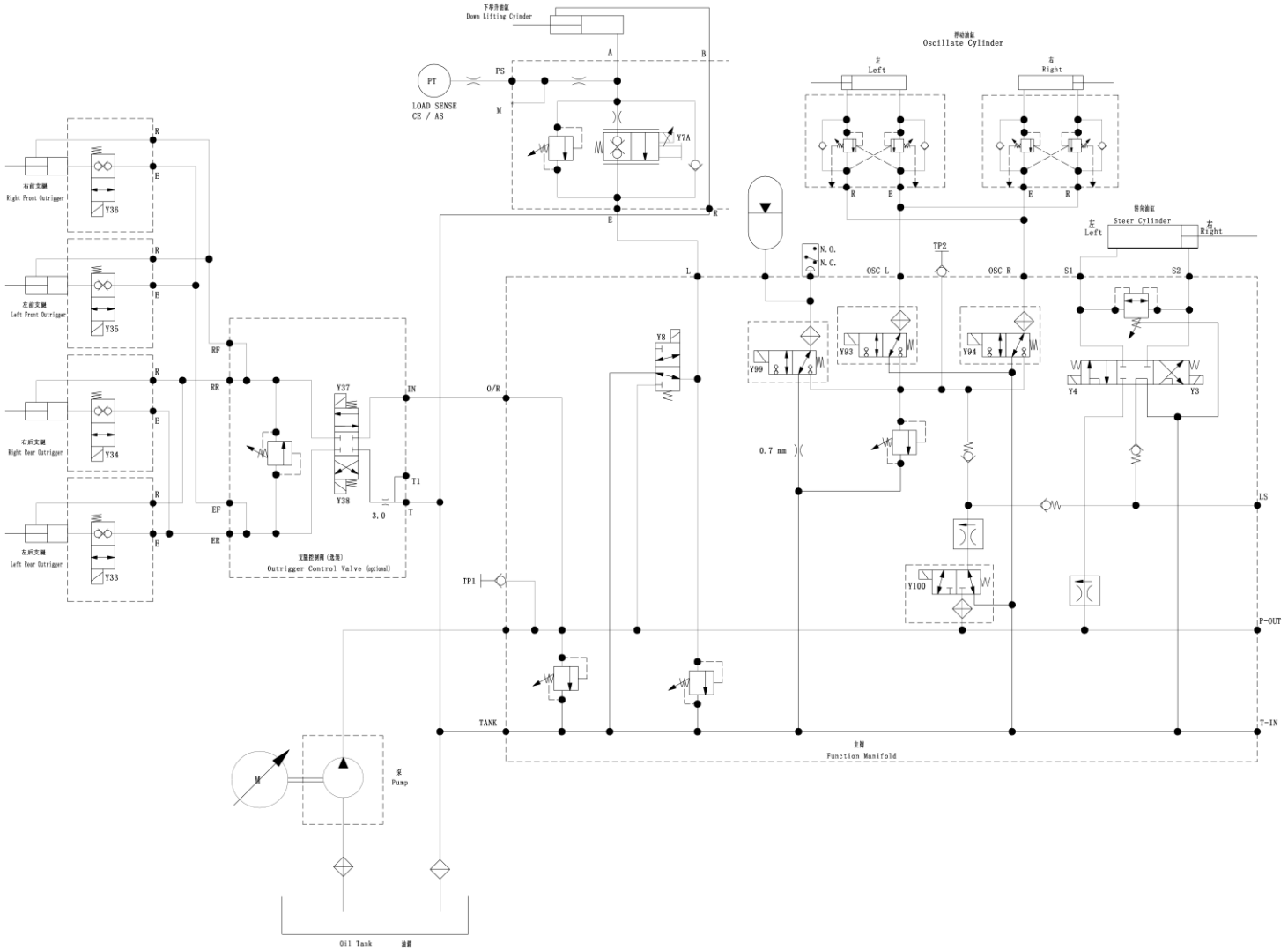
2、Control circuit voltage:24V;

3、Unmarked line diameter is 0.85mm²;

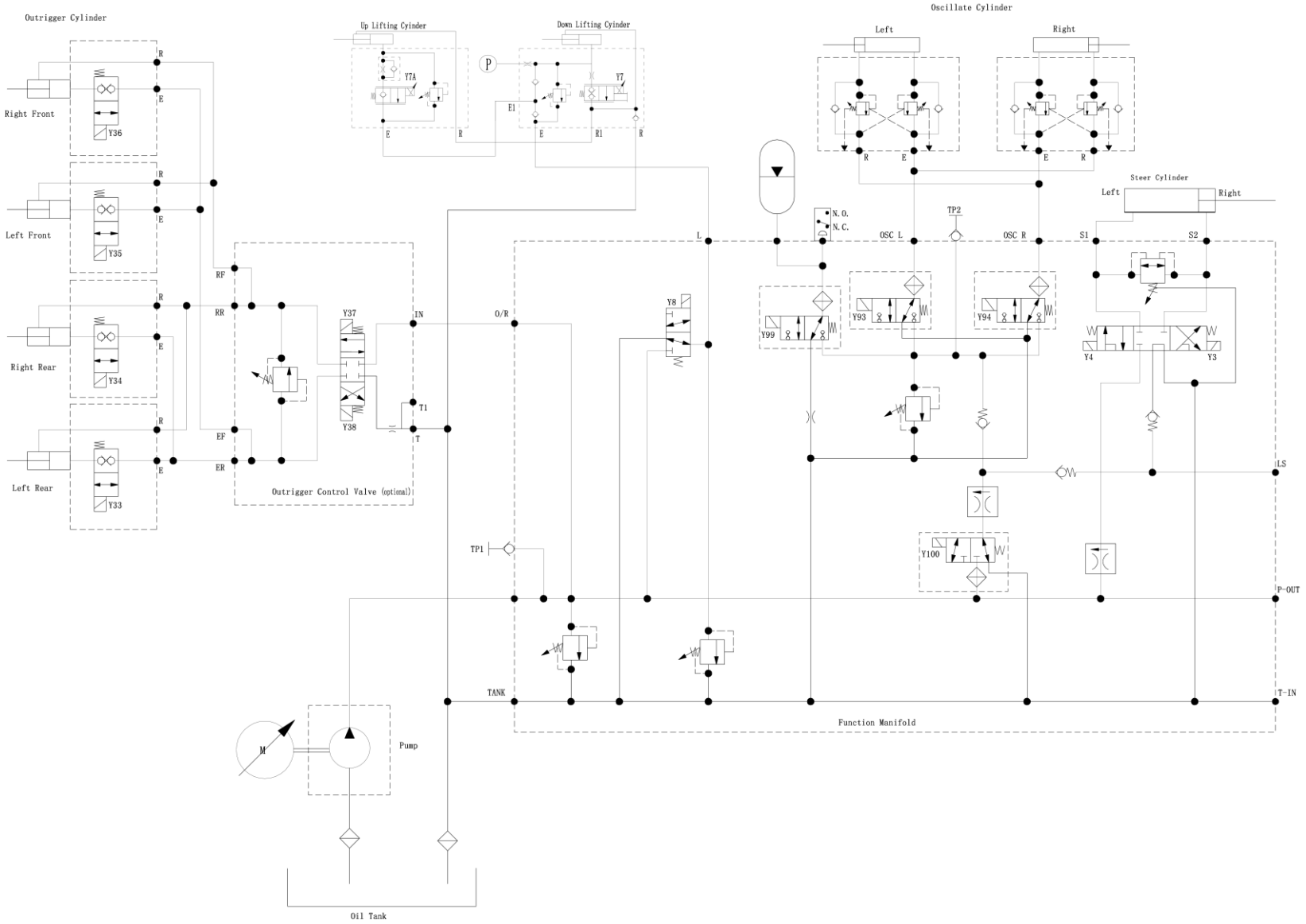
4、Unextended state.

6.4 Hydraulic schematic diagram

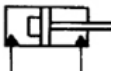
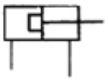
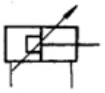
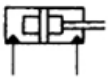
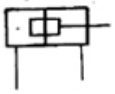
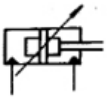
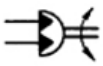
6.4.1 SR3369E Hydraulic schematic diagram

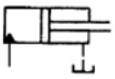
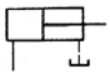
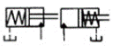
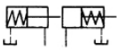
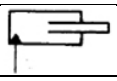
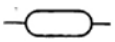
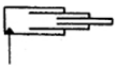
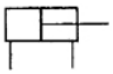
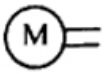
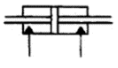
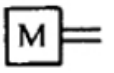
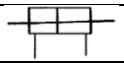
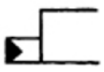
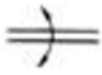
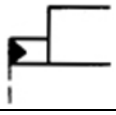
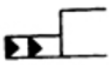


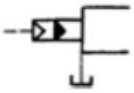
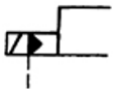
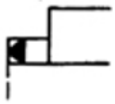
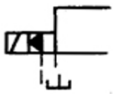
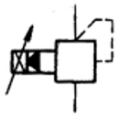
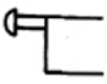
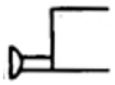
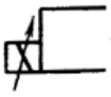
6.4.2 SR4069E Hydraulic schematic diagram

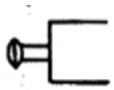
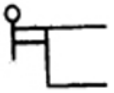
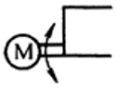
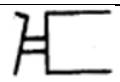
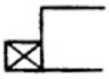
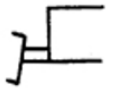
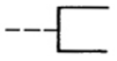
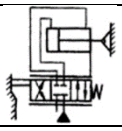
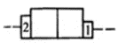
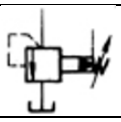
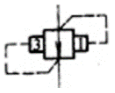
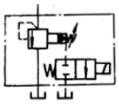
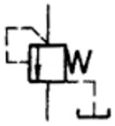
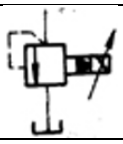
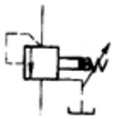
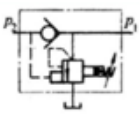
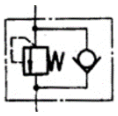


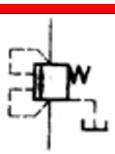
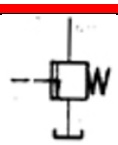
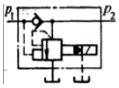
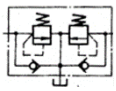
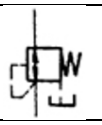
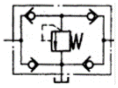
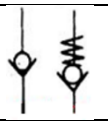
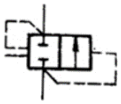
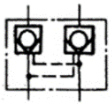
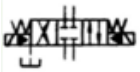
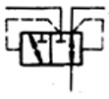
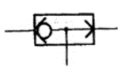
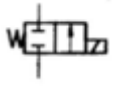
6.5 Diagram of common hydraulic part symbols

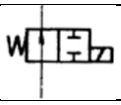
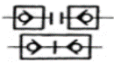
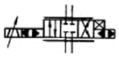
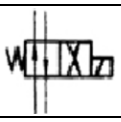
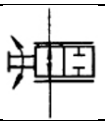
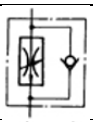
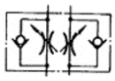
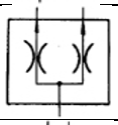
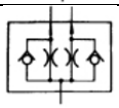
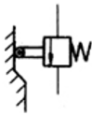
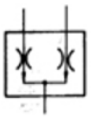
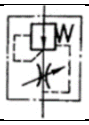
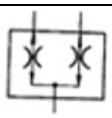
(1) Hydraulic pump, hydraulic motor and hydraulic cylinder							
Name		Symbol	Description	Name		Symbol	Description
Hydraulic pump	Hydraulic pump		General symbol	Double-acting cylinder	Non-adjustable one-way bounce cylinder		Detailed symbol
	One-way fixed displacement hydraulic pump		One-way rotation, one-way flow and fixed displacement				Simplified symbol
	Two-way fixed displacement hydraulic pump		Two-way rotation, two-way flow, fixed displacement		Adjustable one-way bounce cylinder		Detailed symbol
	One-way variable hydraulic pump		One-way rotation, two-way flow, variable displacement				Simplified symbol
	Two-way variable displacement hydraulic pump		Two-way rotation, two-way flow, variable displacement		Non-adjustable two-way bounce cylinder		Detailed symbol
Hydraulic motor	Hydraulic motor		General symbol				Simplified symbol
	One-way fixed displacement hydraulic motor		One-way flow, one-way rotation		Adjustable two-way bounce cylinder		Detailed symbol
	Two-way fixed displacement hydraulic motor		Two-way flow, two-way rotation, fixed displacement				Simplified symbol
	One-way variable displacement hydraulic motor		One-way flow, one-way rotation, variable displacement		Telescopic bar		
	One-way variable displacement hydraulic motor		Two-way flow, two-way rotation, variable displacement	Pressure converter	Gas-liquid converter		One-way action
	Swing motor		Two-way swing, fixed angle				Continuous action

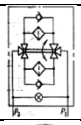
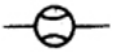
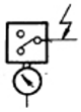
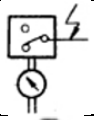
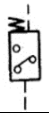
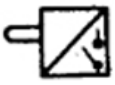
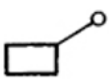
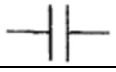
Pump-motor	Fixed displacement hydraulic pump-motor		One-way flow, one-way rotation, fixed displacement		Turbocharger		One-way action
	Variable displacement hydraulic pump-motor		Two-way flow, two-way rotation, variable displacement, external oil drain				Continuous action
	Hydraulic integral transmission		Unidirectional rotation, variable displacement, fixed displacement motor	Accumulator	Accumulator		General symbol
Single-acting cylinder	Single piston rod cylinder		Detailed symbol		Gas isolation type		
			Simplified symbol		Weight-loaded type		
	Single piston rod cylinder (with return spring)		Detailed symbol		Spring type		
			Simplified symbol	Auxiliary gas cylinder			
	Plunger rod			Gas tank			
	Telescopic cylinder			Energy source	Hydraulic pressure source		General symbol
Double-acting cylinder	Single piston rod cylinder		Detailed symbol		Air pressure source		General symbol
			Simplified symbol		Motor		
	Double piston rod cylinder		Detailed symbol		Prime motor		Except motor
			Simplified symbol				
(2) Mechanical control device and control methods							
Mechanical control parts	Straight moving rod		Arrows can be omitted	Pilot pressure control method	Hydraulic pilot pressure control		Internal pressure control
	Axle of rotary motion		Arrows can be omitted		Hydraulic pilot pressure control		External pressure control
	Positioning device				Hydraulic secondary pilot		Internal pressure control,

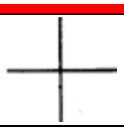
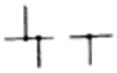
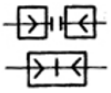
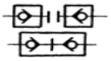
					pressure co ntrol		internal oil drain
	Locking device		* Control method for unlocking		Gas-liquid pilot pressure co ntrol		External control of air pressure, hydraulic internal control, external oil drain
	Bounce mechanism				Electro-hydr aulic pilot pressure control		Hydraulic external control, internal oil drainage
	Ejector rod type				Hydraulic pilot pressure relief control		Internal pressure control, internal oil drain
	Variable travel control type						External pressure control (with remote relief outlet)
	Spring control type				Electro-hydr aulic pilot control		Electromagn et control, external pressure control, external oil drain
	Roller type		Two-directio n operation		Pilot pressure control valve		With pressure regulating spring, external oil drain and with remote relief outlet
	One-way roller type		It's only operated in one direction, so the arrow can be omitted.		Pilot proportional solenoid pressure control valve		Priority is controlled by proportional electromagne t with internal oil drainage
Manual control method	Manual control		General symbol	Electrical control method	Single-actin g electromag net		The electrical lead can be omitted, and the slash can also be directed to the lower right.
	Button type				Double-acti ng electromag net		
	Button type				Single-actin g adjustable electromag netic operation (proportiona l electromag net)		

	Press-pull type				Double-acting adjustable electromagnetic operation (torque motor, etc.)		
	Handle type				Rotary motion electrical control device		
	One-way pedal type			Feedback control method	Feedback control		General symbol
	Two-way pedal type				Electrical feedback		The position is detected by potentiometer, differential transformer, etc.
	Pressurization or relief control				Internal mechanical feedback		Such as follower valve profiling control circuit
	Differential control						
	Internal pressure control		The control channel is inside the original				
	External pressure control		The control channel is outside the original				
(3) Pressure controller							
Relief valve	Relief valve		General symbols or direct-acting relief valve	Pressure reducing valve	Pilot proportional solenoid pressure reducing valve		
	Pilot relief valve				Proportional pressure reducing valve		Pressure reducing ratio: 1/3
	Pilot electromagnetic relief valve		(Normally closed)		Constant difference pressure reducing valve		
	Direct-acting proportional relief valve			Sequence valve	Sequence valve		General symbols or harmonious-acting sequence valve
	Pilot proportional relief valve				Pilot sequence valve		
	Unloading relief valve		Unloading it when p2>p1		One-way sequence valve (balance valve)		

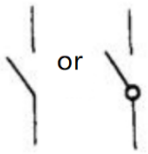
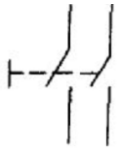
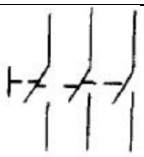
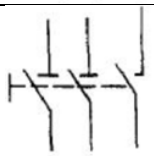
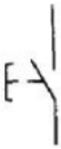
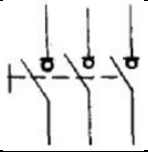
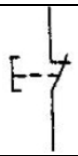
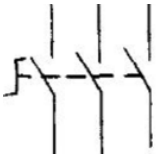
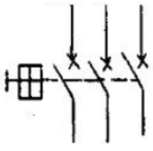
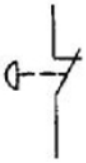
	Two-way relief valve		Direct-acting, external oil drain	Unloading valve	Unloading valve		General symbols or direct-acting unloading valve
Pressure reducing valve	Pressure reducing valve		General symbols or direct-acting pressure reducing valve		Pilot electromagnetic unloading valve		p1>p2
	Pilot pressure reducing valve			Brake valve	Double overflow brake valve		
	Relief pressure reducing valve				Overflow oil bridge brake valve		
(4) Directional control valve							
Check valve	Check valve		Detailed symbol	Reversing valve	Two-position five-way hydraulic valve		
			Simplified symbol (spring can be omitted)		Two-position four-way motorized valve		
Hydraulic check valve	Hydraulically controlled check valve		Detailed symbol (controlling pressure shutoff valve)		Three-position four-way solenoid valve		
			Simplified symbol		Three-position four-way electro-hydraulic valve		Simplified symbol (internal leakage and external control)
			Detailed symbol (controlling pressure opening valve)		Three-position six-way hand valve		
			Simplified symbol (spring can be omitted)		Three-position five-way solenoid valve		
	Double hydraulically controlled check valve				Three-position four-way electro-hydraulic valve		External control and internal leakage (with manual emergency control device)
Shuttle valve	Or gate valve		Detailed symbol		Three-position four-way proportional valve		Throttling type, overlapped center
			Simplified symbol		Three-position four-way proportional valve		Underlapped center
Reversing valve	Two-position two-way solenoid		Normally closed		Two-position four-way proportional		

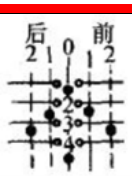
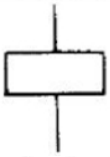
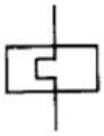
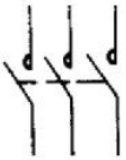
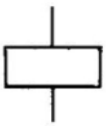
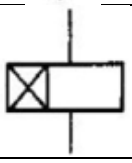
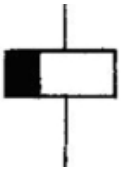
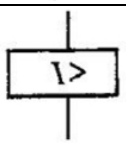
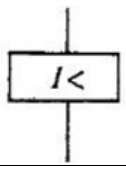
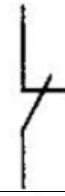
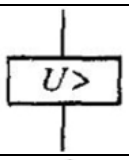
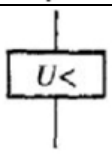
	valve				valve		
			Normally open		Four-way servo valve		
	Two-position three-way solenoid valve				Four-way electro-hydraulic servo valve		Level 2
	Two-position three-way solenoid ball valve						Live feedback level 3
	Two-position four-way solenoid valve						
(5) Flow control valve							
Throttle valve	Adjustable throttle valve		Detailed symbol	Flow regulating valve	Flow regulating valve		Simplified symbol
			Simplified symbol		Bypass type flow regulating valve		Simplified symbol
	Non-adjustable throttle valve		General symbol		Temperature compensated flow regulating valve		Simplified symbol
	One-way throttle valve				One-way flow regulating valve		Simplified symbol
	Double one-way throttle valve			Synchronous valve	Flow divider valve		
	Stop valve				One-way flow divider valve		
	Roller-controlled throttle valve (deceleration valve)				Flow combiner valve		
Flow regulating valve	Flow regulating valve		Detailed symbol		Diverter collector valve		
(6) Oil tank							
Atmospheric type	Pipe end above the liquid level			Oil tank	Pipe end at the bottom of the oil tank		
	Pipe end above the liquid level		With air cleaner		Local oil drain or return		
				Pressurized oil tank or closed oil tank			Three oil circuits
(7) Fluid regulator							

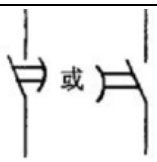
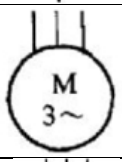
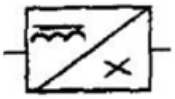
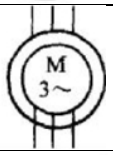
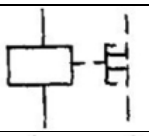
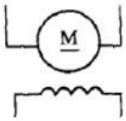
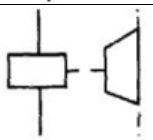
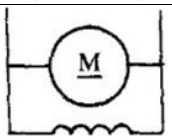
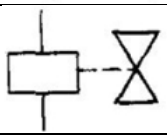
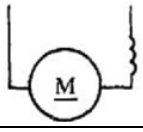
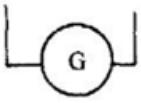
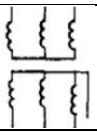
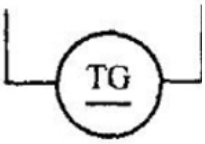
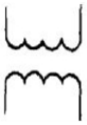
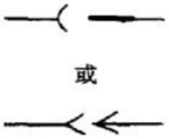
Filter	Filter		General symbol	Air cleaner			
	Filter with pollution indicator			Temperature regulator			
	Magnetic filter			Cooler	Cooler		General symbol
	Filter with bypass valve				Cooler to the coolant pipeline		
	Duplex filter		P1: oil inlet P2: oil return	Heater			General symbol
Pressure detector	Pressure indicator			Flow detector	Galvanometer (liquid flow indicator)		
	Pressure gauge				Flowmeter		
	Electric contact pressure gauge (pressure display controller)				Accumulated flowmeter		
	Differential pressure control gauge			Thermometer			
Level gauge				Tachometer			
				Torque meter			
(9) Other auxiliary components							
Pressure relay (pressure switch)			Detailed symbol	Differential pressure switch			
			General symbol	Sensor	Sensor		General symbol
Travel switch			Detailed symbol		Pressure sensor		
			General symbol		Temperature sensor		
Coupling	Coupling		General symbol	Amplifier			
	Flexible coupling						
(10) Pipeline, pipeline joints and connectors							

Pipeline	Pipeline		Pressure pipeline and return pipeline	Pipeline	Cross pipeline		The two pipelines are crossed and unconnected
	Control pipeline		Two pipelines intersected and connected		Flexible pipeline		
	Control pipeline		It can represent an oil draining pipeline		One-way air bleeder		
Quick-change connector	Quick connector without check valve			Rotary connector	Single-channel rotary connector		
	Quick connector with check valve				Three-way rotary connector		

6.6 Diagram of common electrical part symbols

Socket	Name	Graphic symbol	Letter symbol	Category	Name	Graphic symbol	Letter symbol
Switch	Unipolar control switch		SA	Position switch	Normally open contact		SQ
	General symbols of manual switch		SA		Normally closed contact		SQ
	Three-level control switch		QS		Composite contact		SQ
	Three-level isolating switch		QS	Button	Normally open button		SB
	Three-level load switch		QS		Normally closed button		SB
	Combination knob switch		QS		Composite button		SB
	Low voltage circuit breaker		QF		Emergency stop button		SB

	Controller or operating switch		SA		Key-operated button		SB
Contactor	Coil operating device		KM	Thermal relay	Thermal element		FR
	Normally open main contact		KM		Normally closed contact		FR
	Normally open auxiliary contact		KM	Intermediate relay	Coil		KA
	Normally closed auxiliary contact		KM		Normally open contact		KA
Time relay	Power-on delay (slow pull-in) coil		KT		Normally closed contact		KA
	Power-off delay (slow release) coil		KT	Current relay	Overcurrent coil		KA
					Undercurrent coil		KA
	Normally open contact which is Instantaneously closed		KT		Normally open contact		KA
	Normally closed contact which is instantaneously disconnected		KT		Normally closed contact		KA
	Normally open contact which is closed with delay		KT	Voltage relay	Overvoltage coil		KV
	Normally closed contact which is disconnected with delay		KT		Undervoltage coil		KV

	Normally closed contact which is closed with delay		KT		Normally open contact		KV
	Normally open contact which is disconnected with delay		KT		Normally closed contact		KV
Electromagnetic operator	General symbol of electromagnet		YA	Motor	Three-phase cage asynchronous motor		M
	Electromagnetic chuck		YH		Three-phase wound rotor asynchronous motor		M
	Electromagnetic clutch		YC		Separately excited DC motor		M
	Electromagnetic brake		YB		Shunt DC motor		M
	Solenoid valve		YV		Series DC motor		M
Non-electricity-controlled relay	Speed relay normally open contact		KS	Fuse	Fuse		FU
	Pressure relay normally open contact		KP	Transformer	Single-phase transformer		TC
Generator	Generator		G		Three-phase transformer		TM
	DC tachometer generator		TG		Voltage transformer		TV
Lamp	Signal lamp (indicator lamp)		HL	Transformer	Current transformer		TA
	Lighting lamp		EL	Connector	Plug and socket		X Plug XP Socket XS